JAN 3 1945

ENGINEERING NEWS-RECORD

DECEMBER 28, 1944

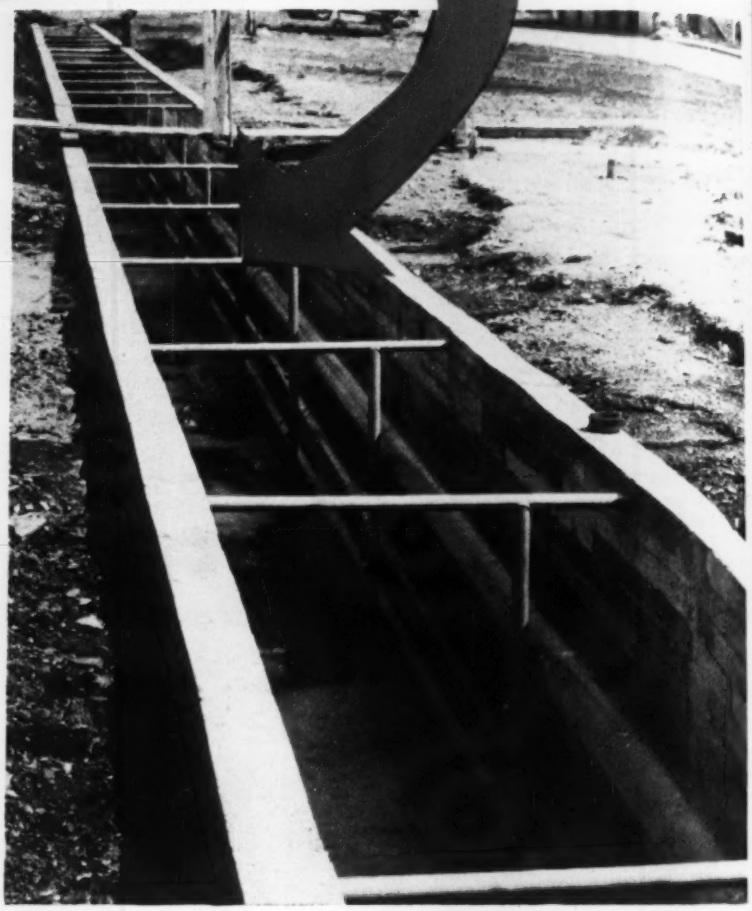
Featuring

ARTIFICIAL HARBORS ON THE BEACHES OF NORMANDY

"Omaha," the American landing beach on the Normandy coast on the day before the great storm wrecked its breakwaters and landing bridges

BYERS WROUGHT IRON

is a veteran in the "UNDERGROUND"



Every engineer who has to install or maintain underground steam lines will understand the problem confronting the Veteran's Hospital, Chillicothe, Ohio. A 4-inch vacuum return and a 3-inch medium pressure drip line had to be installed in an existing tunnel.

Such lines are cold during a major portion of the year, and it is practically impossible to keep moisture from accumulating in the duct. Once a film of water forms on the pipe, atmospheric gases are dissolved in it, and corrosive attack invariably follows.

Fortunately, the engineers had an excellent guide in material selection right before them: a 6-inch wrought iron steam supply line, installed in the tunnel in 1927. The new lines are Byers Wrought Iron.

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JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

...ol. 133 DECEMBER 28, 1944 No. 26

...COMING NEXT

...Methods of widening highways, ...hich is one of the current problems ...f highway engineers in these days ...hen new construction is limited, ...ill be given in the Annual High-...ay Number, January 11. Other ...eatures of this issue will be a dis-...ssion of truck size and weight re-...trictions for future highway work, ...nd details of important postwar ...rojects.

...Also in this issue: An illuminating ...rticle on Pacific battlefront sanita-...ion experiences and the methods be-...g employed to safeguard the health ...f our troops; tests and investiga-...ions being conducted by the Ten-...essee Valley Authority on the use ...f asphalt grout to stop severe leak-...ge from reservoirs; use of precise ...eveling equipment to speed up sur-...eying work, increase accuracy and ...ut cost; design and construction ...eatures of airplane propeller test ...ells at Wright Field.

LOOKING AHEAD

• Maintaining a smooth and dust-free surface on concrete floors where they are subjected to heavy traffic by steel-tired warehouse trucks is a constant maintenance problem. A method, which will be described in the Jan. 25 issue, has been developed for resurfacing trucking-aisles with concrete and asphalt mastic, also procedures for the hardening of concrete to prevent dusting.

• A water reservoir of unusual design is being built in Washington, D. C. The structure is in the form of an open-bowl, and is enclosed by a 17-ft. high brick baffle wall of serpentine design, which is expected to increase its stability. Construction provides for a future roof when the structure will be used as a recreational building. The project will be described in the Jan. 25 issue.

• Some suggestions will be included in the Jan. 25 issue on "Adding Years of Service to Equipment," which will be of special interest to contractors who are endeavoring to extend the life of their machines through the early postwar years when this type of equipment may be difficult to obtain.

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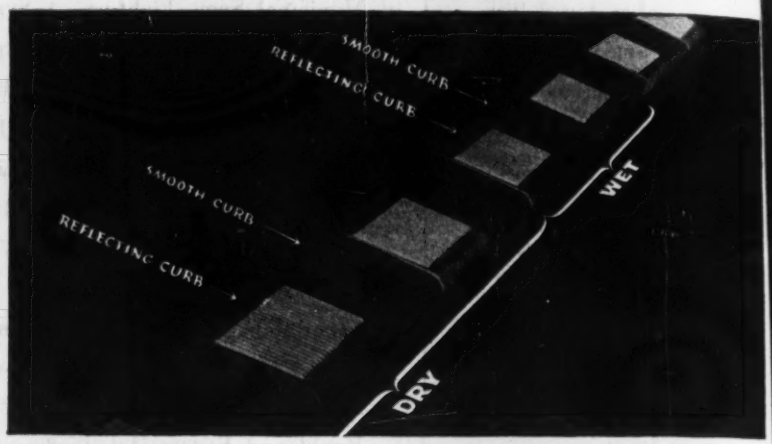

Night view of test section of smooth white and reflecting white curb in which all sections are made of identical white materials. Smooth sections when dry appear gray, and when wet appear black, and hence are almost invisible. In strong contrast, reflecting faces when dry are bright, and when wet are brighter still and hence even more visible

BECAUSE curb defines the road's edge, it is the driver's guide to safety.

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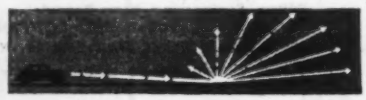
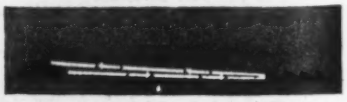
A smooth curb (left) wastes light . . . reflects it up and away from the driver. A White Concrete Reflecting Curb (right) conserves light . . . reflects it back to the driver. A smooth curb is barely visible at night; a White Concrete Reflecting Curb stands out—bright and clear.





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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • DECEMBER 28, 1944 • VOLUME 133 • NUMBER 26

Problem of airfield design studied by Army Engineers

Increasing weight of military airplanes and consequent higher cost and greater difficulty of airfield construction necessitate intensive study and laboratory work.

The Chief of Engineers, U. S. Army, has recently established a board of consultants to inform his office of airfield development and design problems and has delegated specific functions in airfield development studies to various laboratories in the Engineer Department, because the increasing weight of military airplanes and the consequent increasing difficulty of airfield construction necessitates the continuation of pavement and other design studies on a large scale.

The board of consultants, composed of nationally prominent engineers in the fields of pavement and soil mechanics, with the chief of the Engineering and Development Division, Office of the Chief of Engineers, as chairman, has the following members: H. M. Westergaard, dean of the graduate school of engineering, Harvard University; Arthur Casagrande, associate professor, graduate school of engineering, Harvard University; J. L. Land, chief engineer of the bureau of materials and tests, Alabama Highway Department; Fred C. Lang, engineer of materials and research, Minnesota Highway Department; O. J. Porter, senior engineer of materials and tests, California Highway Department; and T. A. Middlebrooks, Civil Works Division, Office of the Chief of Engineers.

Pavements and foundations

The Flexible Pavement Laboratory, which is a part of the Embankment, Foundation and Pavement Division of the U. S. Waterways Experiment Station at Vicksburg, Miss., will coordinate tests and investigations relating to bituminous pavements and underlying foundations. The Rigid Pavement Laboratory, which is a part of the Cincinnati Testing Laboratory of the Engineer Department's Ohio River Division, will coordinate tests and investigations relating to concrete pavements and underlying foundations. The Frost Effects Laboratory, which is part of the Soils Laboratory of the U. S. Engineer district office, Boston, Mass., will correlate tests and investigations relating to behavior of subgrades and base courses subjected to frost action.

The progress which has been made since 1940, when the U. S. Engineer Department was given the responsibility for military airfield construction, is the result of large-scale and broadly conceived experimentation, intensive investigation of the experience of the department and other agencies, and close liaison with the Army Air Forces. Including experimental tests to determine the effect of repetitions of loads on various types and thicknesses of pavements, these investigations have led to the tentative adoption of design curves and the correlation of test data to substantiate their validity.

Under current observation by several of the department's field offices is the service behavior of airfield drainage systems, and resulting reports are being studied by the Office of the Chief of Engineers with a view toward improving design criteria on the basis of experience.

The problem of airfield layout, as to length, width, and grades of runways; location of taxiways; dimensions of safety zones; and related factors, is under intensive review and restudy jointly by the Office of the Chief of Engineers and the Army Air Forces.

• • •

N. Y. plan commission approves 83 projects

The New York State Postwar Public Works Planning Commission has announced that it has approved a total of 83 projects, involving construction at 24 mental hygiene institutions. The estimated construction cost of this work is $52,474,643. Plans for projects costing $9,163,893 are already completed, or under way. Plans for the balance will be started immediately.

This work involves, for the most part, an increase in badly needed patient facilities. At present the department is caring for 12,700 patients in excess of the certified capacity of the institutions. In a few cases, it will be necessary to replace, or augment, present power and heating plants to take care of the proposed new construction.

The institutions are in New York City and in the following counties: Broome, Erie, Suffolk, Livingston, Cataraugus, Dutchess, Rockland, Oneida, Orange, Wayne, Monroe, St. Lawrence, Onondaga and Seneca.

Kaiser to build 4,000 aluminum pontons for Army

Award of a $12,000,000 contract to the Kaiser Oregon Shipbuilding Corp., of Portland, Ore., to construct 4,000 aluminum pontons for the Army, was announced Dec. 21 by the United States Army Engineers.

Col. Ralph A. Tudor, district army engineer in Portland, was quoted as saying that the pontons will be used as floating bridges by the Engineers Corps to facilitate the landing of troops, supplies and rolling equipment on the various war fronts.

With work carrying an AA-1 priority rating, the contract specifies that the first 200 units, the equivalent of 100 completed pontons, shall be ready for delivery by March, 1945. Other scheduled deliveries are: 300 in April, 600 in May, 900 in June, 1000, in July, and 1000 in August.

Edgar F. Kaiser, general manager of the Kaiser Shipbuilding interests in the Portland area, was quoted as stating that the new contract will not interfere with the Victory ship program for the Maritime Commission, now in full swing.

Federal-aid road bill signed by President

The bill appropriating $1,500,000,000 for federal aid in building state highways was signed by President Roosevelt on Dec. 20.

The text of the President's statement in connection with the signing is as follows.

"I have signed today the Federal-Aid Highway Act of 1944 (S2105), which makes several important changes in the national policy regarding the development of our highway transportation system.

"Among other things, it authorizes the joint designation by the States and Federal Government of an interregional highway network, as recommended in the report of the National Committee on Interregional Highways, which I transmitted to the Congress on Jan. 12, 1944. (*ENR*, Dec. 21, p. 1)

"It gives practical recognition to the transportation problems of our cities by extending Federal aid to projects in urban areas which will reduce traffic congestion and accidents.

"The act provides substantial authorizations for the improvements of farm-to-market roads, serving the day-by-day economic and social needs of our rural population.

"Finally, it authorizes funds on a matching basis with the States for at least a beginning of the huge task of replacing or rebuilding the main roads on our Federal-aid system which are being worn out by the heavy burden of wartime traffic.

"Adequate facilities for highway communication will be essential in the future as a part of an expanding, prosperous economy that will insure jobs. They will be essential also to the national defense, as well as to the safe and efficient transportation services which belong to America's way of living.

"This legislation makes possible the advance planning of the needed facilities on a sound basis. Now it becomes a challenge to the States, counties and cities which must originate the specific projects and get the program ready for construction after the war ends. It is likewise a notice to the forty-four State Legislatures which convene in 1945 that the highway program will require their prompt and vigorous attention."

. . .

Rivers and Harbors Bill killed by the Senate

The Senate last week killed the Rivers and Harbors bill. It died because of lack of Senate action on the conference report which was in disagreement on the House and Senate versions of the bill. The legislation was blocked by a group of western senators who opposed an amendment in the house bill exempting the Central Valley, Calif., land from reclamation water limitations. The House conference committee refused to strike the amendment from the bill notwithstanding the opposition.

Chairman Hatch of the Senate public lands committee and Senator La Follette were prepared to filibuster the amendment if Chairman Bailey sought its approval. A new bill will be offered in the next Congress, according to Bailey.

. . .

Water control agency urged for Potomac basin

Approval of an enlarged program of research looking into the causes of pollution and a request for taking steps to obtain $2,000,000 to complete the Savage River Dam (*ENR*, Dec. 14, 1944, p. 124) in western Maryland, were among the major actions taken at a recent meeting of the Interstate Commission on the Potomac River Basin. The commission not only recommended the creation of a central water control agency and the completion of the Savage River Dam, but decided to request the aid of members of Congress and the governors of member states, including Virginia, Maryland, West Virginia and Pennsylvania, in obtaining needed funds. It was contended that completion of the dam would help increase the flow in the Potomac during low water periods.

Abel Wolman, member of the commission, recommended that the state give legislative sanction to an administrative unit which would complete the responsibility of stream pollution and the power to review the status of the streams. One of the biggest problems facing the interstate commission is the formation of a master plan for the development of the Potomac River Basin, according to Raymond V. Long, state planning director of Virginia.

. . .

Maumee Bay breakwater to cost $2,720,000

The city council of Toledo, Ohio, recently approved a revised project providing for the construction of a breakwater across Maumee Bay, from Little Cedar Point to Turtle Island, with a channel opening, at an estimated cost of $2,720,000. This action was taken after conference with William H. Gould, state agent of the Ohio Department of Public Works, who now is engaged in preparing an estimate of the state's share of the cost, for submission to the Lake Erie Beach erosion subcommittee of the Ohio Postwar Plan Commission. Construction of such a breakwater was requested by city officials at a public hearing in February, 1941, but the Chief of the U. S. Engineers ruled that the need was not sufficient at that time.

New Flood Control Act not to jeopardize MVA

In signing the Flood Control Bill, H.R. 4485 on Dec. 22, providing for postwar flood control projects calling for an estimated expenditure of $1,000,000,000, President Roosevelt intimated that the legislation would not interfere with the creation of the proposed Missouri Valley Authority which he urged for early consideration by the next Congress. He also made this statement:

"I consider the project authorized by the bill to be primarily for postwar construction, and, until the current wars are terminated, I do not intend to submit estimates of appropriation or approve allocations of funds for any project that does not have an important and direct value to the winning of the war."

Among the projects provided are:

A 12-ft. navigable channel in the Mississippi River from Cairo, Ill., to Baton Rouge, La., at a cost of $200,000,000.

The White River Basin in Arkansas, $45,000,000.

Connecticut River Basin, $30,000,000.

Ohio River Basin, $70,000,000.

Roanoke River Basin, $36,140,000.

All states affected are given the right to review all future flood control and reclamation projects surveyed by the Army Engineers and the Bureau of Reclamation. Western states obtain priority rights on water for irrigation, mining, domestic and industrial uses.

. . .

R. T. Branch, president of Stone & Webster

Russell T. Branch on Dec. 20 was elected president of the Stone & Webster Engineering Corp. to succeed John R. Lotz who was made chairman of the board after serving eight years as president.

Mr. Branch's election to the presidency follows more than thirty years with Stone & Webster during which he has been successively superintendent of construction, construction manager, vice president and senior construction manager and executive vice president.

Directors also announced the election of Emmart LaCrosse as vice chairman of the board, Joseph Pope as first vice president and Earl Finsterbusch, H. E. Brailey, R. E. Argersinger and H. L. Bruce, Jr., as vice presidents of the corporation.

NLRB forbids status change for men who join collective-bargaining group

General Motors Corp. ruled guilty of unfair labor practice in transferring engineers from salary to hourly wage group.

A precedent concerning the unionization of engineers was set when the National Labor Relations Board on Dec. 20 ordered the General Motors Corp. to return many of its professional employees to a salary classification and to restore to them all the rights and benefits that were part of that status. The board ruled that the company was guilty of an unfair labor practice and of anti-union discrimination when it transferred employees from a salary classification to the hourly pay group because they had chosen a collective bargaining representative.

Changed to hourly pay

The first case of its kind to appear before the board, the ruling dealt specifically with engineers and technicians of the General Motors Corporation's Product Engineering Department at Linden, N. J., who had designated the Federation of Architects, Engineers, Chemists and Technicians, Chapter 31, CIO, as their collective-bargaining agent. Within two weeks after the F.A.E.C.T. had been so designated, these employees, the board said, were transferred from salary status to hourly rates of pay. Subsequently their efforts to have the transfer rescinded were unsuccessful.

After hearings and investigations, NLRB concluded that "the transfer was of such character as to have a natural tendency to discourage union membership."

Employees lost privileges

In meetings with union representatives and before the board, the company contended that the method of paying employees was solely a management matter and hence outside the province of collective bargaining.

"What is involved here", the board replied, "is more than the academic query whether compensation shall be computed by one method of calculation or by another. For one thing, the contention leaves out of account certain factors in the status itself, such as prestige and standing, factors untranslatable in terms of pecuniary advantage. Moreover, in this case, there were attributes of the salaried status susceptible of measurement in terms of tangible gain.

"It is apparent that the transfer deprived employees of advantages of real and tangible value. Thus, for example, they actually lost valuable insurance protection and payment for absent time, both of which they enjoyed prior to the transfer, and both of which they ceased to enjoy thereafter.

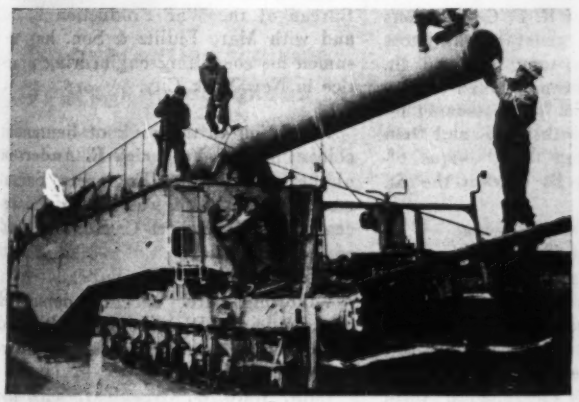
"Therefore, whether or not the employees should have been on a salaried or an hourly basis and whether or not they should have retained the benefits of the salaried status were questions vitally affecting their conditions of employment."

Although this ruling of the NLRB was given in a local case applying to men chiefly in the mechanical engineering field, its effect is expected to be widespread. In the first place, the order is expected to affect other plants of the General Motors Corp. as the policy with respect to professional employees that was applied in this case has been applied in other plants. Of wider significance is the fact that in a plant where the great majority of the employees were members of another union, the NLRB recognized the right of the engineers and technicians to representation by another collective-bargaining unit of their own choosing.

• • •

Sewage treatment study being made at Toledo

Tests of the water of Lake Erie and Maumee Bay are being made for Toledo, Ohio, by Jones & Henry of that city to determine the dispersion effect of liquid waste and make recommendations for additional equipment for the sewage treatment plant and pumping station, it has been announced by George N. Schoonmaker, city manager. The study, for which $5,000 has been set aside, is also expected to reveal information as to the effect of wind and current upon the city water supply intake two miles off shore at nearby Reno Beach.



U. S. Signal Corp. photos from British Combine

Bridge repaired with steel from captured Nazi railroad gun

When the Germans demolished the Pont de l'Arc Bridge, near Aix, France, they interrupted an important railroad communications link with the ports of Marseille, Toulon and other coastal towns.

It was estimated that the span could be repaired within three weeks by using a Bailey Bridge. However, the necessity of moving trains over this route to supply our advancing armies required that the job be done in far less time.

To expedite matters, men of the U. S. 343rd Engineer Regiment scouted the surrounding territory and found the German railroad gun shown above. By dismantling the gun it was found possible to use the steel members of the truck frame as girders to span the demolished sections of the bridge. Other accessory members were adapted for struts as shown in the illustration at right. This feat took only four days.

MEN AND JOBS

Theodore H. Sanderson, assistant superintendent of quality control of the U. S. Steel Corporation's armor plate division at Gary, Ind., since 1942, has been promoted to division superintendent of the armor plate plant. He succeeds the late E. N. Yost who died last September.

A civil engineering graduate of Johns Hopkins University in 1925, Mr. Sanderson has been with Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel, since 1933. In 1939 he was made assistant to the superintendent of the rail mill at Gary, in which position he served until being transferred to the armor plate division.

Announcement of the appointment of **J. L. Burkholder,** former assistant general manager of the Metropolitan Water District of Southern California, as manager-engineer of the San Diego County Water Authority, was made recently by Fred L. Simpson, chairman of the authority.

Mr. Burkholder at present is supervising construction of the Horseshoe Dam in Arizona. He was in charge of construction of the Metropolitan Water District's main Colorado river aqueduct between 1933-38, and was senior American engineer of the United States-Mexican International Boundary Commission until 1942.

Mr. Simpson said that Mr. Burkholder's main responsibility in his new position will be to analyze Reclamation Bureau surveys of alternative routes for bringing Colorado River water into San Diego. Two routes have been proposed. One extends north to connect with the Metropolitan Water District's system, and the other extends east to the All American canal.

Gerald T. McCarthy is now a partner in the firm of Parsons, Brinckerhoff, Hogan & Macdonald, consulting engineers, and has been made managing director of the firm's business in Latin America. He is located at C. A. Calle Sur 17, No. 27, Caracas, Venezuela.

Recently the following men were elected county engineers in eastern Ohio—**Karl Snyder,** Holmes County; **Luther K. Zerbe,** Stark County; **Walter H. Metzler,** Wayne County; **Charles O. Snyder,** Columbiana County; and **George E. Arnold,** Tuscarawas County.

Fred G. Gordon, senior filtration engineer for the Department of Public Works, Chicago, since 1941, has been promoted to assistant city engineer. A civil engineering graduate of the University of Illinois in 1912, Mr. Gordon was engaged in private consulting engineering practice in Chicago from 1920 until accepting employment with the city in 1941.

Frank Alex McTavish, Quebec engineer, who won the Distinguished Service Order for clearing under-water obstacles during the invasion of France last June, has been promoted from major to lieutenant colonel in the Canadian army.

James L. McNamara has been appointed city engineer at Juneau, Alaska. He succeeds Hugh Antrim, who resigned.

Harrison Hawkins, formerly Adams County engineer at Ritzville, Wash., has been named Okanogan County engineer at Okanogan, Wash. He succeeds **Rod P. Ryker,** who has moved to Bremerton, Wash.

The firm name of R. F. Conlon Sons Construction, Co., general contractors with offices at Dubuque, Ia., and St. Cloud, Minn., has been changed to Conlon Construction Co. The personnel remains unchanged with **O. M.** and **Orin J. Conlon** operating the Dubuque offices and **Vincent B. Conlon** the St. Cloud office.

H. E. Smith, of Toronto, has been named district engineer for Canadian National Railways at Montreal. **H. W. Fleming,** who recently moved from Quebec to North Bay, succeeds Mr. Smith as district engineer at Toronto, and Mr. Fleming is succeeded at North Bay by **W. H. B. Bevan** of Montreal.

William D. Alexander, executive officer for Col. Ralph A. Tudor, Portland district Army Engineer, has been promotel from major to lieutenant colonel. A graduate of Virginia Military Institute, he formerly was a consulting engineer in North Carolina. He was in charge of the Mountain Home, Ida., Army air base before going to Portland, Ore., as area engineer in 1943.

Clifton C. Cobb has been appointed assistant secretary of the Alabama state board of registration for professional engineers and land surveyors. Mr. Cobb's duties will include investigations and reports on violations of the registration law amended by the last legislature, placing enforcement obligation on the board and providing penalties for violations.

Appointment of **C. H. Brown** as metropolitan engineer and **A. A. Anderson** as Upper Peninsular construction engineer has been announced by Charles M. Ziegler, Michigan state highway commissioner. Both are veterans with the department, Brown having started in 1920, and Anderson in 1919.

P. E. Moase, formerly assistant field engineer in charge of construction of the Skeena River highway project at Prince Rupert, B. C., has gone to Vancouver to enter the contracting business as a partner of Farris and Nash.

Harold A. Stepleton, consulting engineer of Toledo, Ohio, recently completed 18 months work with the engineering faculty at the University of Toledo. He has returned to private practice as a member of the staff of Floyd G. Browne and Associates, Marion, Ohio, consulting sanitary engineers on water supply, sewage and industrial waste treatment.

Joel D. Marder, formerly with the Washington office of the Facilities Bureau of the War Production Board and with Marc Eidlitz & Son, has resumed his consulting engineering practice in New York City.

Promotion to the rank of lieutenant colonel of **Maj. Frederick E. Anderson** of the United States Engineers, Sacramento, Calif., office, was announced recently by Col. Robert C. Hunter, head of the district.

Following are recent personnel changes in the Division of Health and Sanitation of the Coordinator of Inter-American Affairs:

Capt. John W. Greenleaf, with the field party in Paraguay, and **Capt. Edmund G. Wagner,** with the field party in Brazil, have been promoted to major; **Capt. Edwin L. Dudley** has been transferred from the field party in Venezuela to that in El Salvador; and **Lt. Clyde T. Norman** has returned to the United States after completing his assignment to the field party in El Salvador.

Akron opposes diversion of Cuyahoga River water

Akron, Ohio, will take sharp issue with a recommendation of the Ohio Water Supply Board at Columbus that Akron agree to diversion of water from a new Hiram Rapids Dam for the benefit of Youngstown, according to Wendell R. LaDue, Akron water and sewer division head. The water supply board not only suggests diversions from Akron's watershed, but recommends augmenting Barberton's water reservoir by dredging and boring new wells to increase the supply for Cuyahoga Falls, Lakemore, Hudson, and Twinsburg.

The controversial recommendation for sharing the Cuyahoga River's upper reaches with Youngstown is as follows:

"Akron may well consider giving support to a plan for the U. S. Army Engineers to build the dam at Hiram Rapids as a multiple purpose structure, operation of which would allow for maintaining the pool at spillway crest, and spilling the floodwaters over the divide into the authorized and soon to be constructed Eagle Creek reservoir in the Mahoning River basin. This would provide flood control, silt control, low-flow control, and as much water supply for Akron as could be accomplished by any other plan, a supply sufficient for a population of 500,000", the board members concluded.

Akron, which already has acquired land toward a further reservoir in the Hiram Rapids district, has steadfastly opposed diversion of water from the Cuyahoga River to the Mahoning River for the past ten years, LaDue said.

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Ask apprentice training program be expanded

To expand the nation-wide apprentice training program in the building trades for returning veterans and other American youth was the object of the meeting of the National General Committee on Apprenticeship for the Construction Industry, in Washington, D. C., on Dec. 13.

A resolution adopted by the representatives of unions, employer associations, U. S. Chamber of Commerce and Associated General Contractors who attended this session called for efforts to coordinate more closely than ever before the activities in the different branches of the construction industry in expanding the national apprentice training program. Also called for was extension of trade training under the sponsorship of joint apprenticeship committees, representative of labor and management, in all the building trades both local and national, and for uniform policies in handling apprentice training of returned veterans under the educational and financial aid provisions of the "G. I. Bill". An executive committee was named to effectuate policies of the construction industry and to act in the interim between meetings of the general committee.

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Pullman, Inc., enters construction field

Of considerable interest to the engineering and construction field is the fact that on Dec. 21 Pullman, Inc., concluded negotiations for the acquisition of the entire outstanding stock of the M. W. Kellogg Co., petroleum and chemical engineers. This company recently has completed a war program involving the engineering and construction of 50 refinery installations for the petroleum industry representing an investment of $500,000,000, including the $100,000,000 refinery of Cities Service Co. at Lake Charles, La.

Pullman, Inc., is broadening its activities to compensate for the pending severance of its car-manufacturing and sleeping-car businesses on the result of a federal court decree.

The company has decided to dispose of its business of operating sleeping cars and plans to enter new fields.

This announcement was made jointly by D. A. Crawford, president of Pullman and M. W. Kellogg, president of the engineering company. The announcement said that the Kellogg Co. will be operated as "a separately incorporated member of the Pullman group of companies, with the present staff of officers and employees, and continuing as a specialized research, manufacturing and engineering construction company along the lines which have given Kellogg leadership in its field for more than a quarter of a century."

"By acquisition of the Kellogg company," the announcement continues, "the Pullman group will participate in more diversified lines of engineer-contracting, research and manufacturing activities than heretofore, and it is expected that advantageous results will be effected."

"From the point of view of the Kellogg company, the change is expected to open new opportunities for service to the oil refining and other industries through substantially expanded facilities made possible by increased resources. It also carries the prospect of expansion into other fields where these enlarged facilities may be applied."

Soviet purchasing chief asks U. S. engineers to aid

At a meeting arranged by the Architects Committee, National Council of American-Soviet Friendship, and held on Dec. 19 at the American Russian Institute in New York City, Peter P. Novojilov, chief of the Soviet Purchasing Commission's construction group, explained to a select group of engineers the reconstruction problems faced by his country and outlined a program through which American engineers, architects and building material manufacturers could aid. Following his address, E. C. Ropes, chief of the Russian Unit, Bureau of Domestic and Foreign Commerce, U. S. Department of Commerce, expressed confidence in the future of our Soviet business relations.

Also attending this gathering were 24 Russian engineers visiting the United States for the first time. A round table discussion was held in which the Russians and Americans interrogated each other on questions of mutual interest concerning construction.

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Plans are presented for Houston's freeway

Recently the J. E. Grenier Co., Baltimore, Md., consulting engineers, presented to the Texas State Highway Commission and Houston city officials, a plan for routing State Highway 75, the north-south Dallas-Galveston route, and Texas State Highway 90, the east-west Beaumont-San Antonio route, through Houston. The plan calls for the two highways to traverse the city by using many underpasses and viaducts and at a cost of $60,000,000.

The outstanding feature of Highway 75 in the plan is a 10-block depressed highway; that of Route 90 is viaduct construction over all streets and railroad tracks. The numerous overpasses and underpasses would be of the limited access express highway type. They would do away with cross-traffic and allow side-traffic to enter the highways only at certain points where facilities are provided for safe movement.

The 10-block depressed section would be 100 ft. wide and about 30 ft. below the surface of the existing streets. Pumps would be used to dispose of water in case of excessive rain.

The plan calls for 52 miles of right-of-way in Harris County, at a cost of between $8,000,000 and $12,000,000, to be borne jointly by the city and county, with the city bearing most of it. The $48,000,000 construction cost would be borne by the state and federal governments.

W. H. Kirkbride dies; So. Pacific Co. engineer

Walter H. Kirkbride, 71, of San Francisco, Calif., who until his retirement last January was chief engineer of the Southern Pacific Co., died in Dunsmuir, Calif., on Dec. 20.

Mr. Kirkbride was a classmate of Herbert Hoover in the pioneer Stanford University class of 1895. He began his engineering career as a federal deputy mineral surveyor.

Taking up railroad construction, he became associated with the Sierra Railway and the Shasta Mineral Belt Railway before joining the Southern Pacific in 1902. He was chief engineer for 12 years and had a similar position with the Northwestern Pacific & San Diego, and the Arizona Eastern Railroad, members of the Southern Pacific system.

Among major construction projects with which Mr. Kirkbride has been identified were the rail line around Shasta Dam, the Martinez-Benicia, Calif., railroad bridge, and the Los Angeles Union terminal. He had general supervision of nearly 9,000 miles of railroad in seven states. He was active in studies involving the San Francisco-Oakland Bay Bridge and the Central Valley water project. Formerly he was a director of the American Railway Engineering Association.

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S. M. Rust now chairman of Rust Engineering Co.

S. M. Rust, retiring president of The Rust Engineering Co., has been elected chairman of the board of directors; and S. M. Rust, Jr., executive vice president, has been elected president.

Mr. Rust, Sr., founded the company in 1905 with his brothers, E. M. Rust and the late E. J. Lee Rust, engaging in engineering design and construction of complete industrial plants and facilities. The company has offices at Pittsburgh, Pa., Birmingham, Ala., Washington, D. C., and New York, N. Y.

Mr. Rust, Jr., joined the organization after graduation from Lehigh University.

WPB predicts end of equipment control

Possible changes in control over construction machinery after the end of the European war were discussed recently at meetings of the industry advisory committees representing motor grader, tracklaying tractor, power crane and shovel manufacturers, and of the Over-all Construction Machinery Industry Advisory Committee, the War Production Board has reported.

WPB officials suggest that at that time it would be possible to remove all present controls over the manufacture and distribution of construction machinery, and to provide only that up to 75 percent of the production of critical items and repair parts be reserved for the military if required.

Limitation Order L-192, which controls the manufacture and distribution of construction machinery, now requires that producers manufacture under approved production schedules, or under specific authorization from WPB.

Currently, the military is taking approximately 75 percent of the total production, 100 percent of some items. Between 90 and 100 percent of all new cranes and shovels, 75 percent of the motor graders and 85 percent of the tracklaying tractors are now going to the military, WPB officials said.

Committee members reported that their chief difficulty during the year has been providing repair parts, especially those requiring castings and forging. Critical now are engine parts for used construction machinery.

Bay State postwar plans total $160,000,000

The Massachusetts Emergency Public Works Commission has announced a postwar building program totaling $160,000,000. This includes commonwealth and municipal projects. Subject to approval by the Legislature, the emergency commission recommends new buildings, renovations and improvements to some buildings and other projects to cost $44,833,000. Cities and towns have their own program aggregating $116,000,000 for all types of construction. Plans for this work are in various stages of preparation.

Among the larger projects planned by the commonwealth are the Logan Airport extensions, to cost $7,150,000; a $3,200,000 pier at Commonwealth Pier, Boston; an expenditure of $15,907,000 to expand the bed capacity at state institutions; a new state office building in Boston, $8,000,000. Final plans have been drawn for a total of $12,626,000 worth of projects.

Among the cities and towns of the commonwealth 173 municipalities have plans well advanced or completed for $56,266,164. Additional plans for construction total $60,071,646, and all of this work will be ready for contractors' bids by September, 1945.

Financing of all state work has yet to be arranged. All plans must be submitted to the legislature and passed on individually, after which methods of financing will be determined. A part of the financing may come out of a surplus totaling $10,176,000.

JOBS OF THE WEEK

ORDNANCE PLANT ADDITION, Karnack, Tex.

Monsanto Chemical Co., St. Louis, Mo., awarded a contract for increasing capacity of Longhorn Ordnance plant to Esslinger-Misch Co., Detroit, Mich., at $8,500,000, including equipment. Defense Plant Corp. will finance.

FILTER EQUIPMENT, Chicago, Ill.

City, O. E. Hewitt, commissioner, received the lowest bid for filter equipment, for South District Filtration Plant, from Pitt Construction Co., Inc., Pittsburgh, Pa., at $942,738.

APARTMENTS, Washington, D. C.

Du Pont Park Apartments, Inc., Philadelphia, Pa., awarded a contract for the constructing of Du Pont apartments, to Wark & Co., Philadelphia, Pa., at an estimated cost of $1,750,000. Harvey W. Warwick, and Ernest D. Stevens, Washington, D. C., are the architects, FHA may finance.

DWELLINGS, San Francisco, Calif.

Public Housing Authority, San Francisco, Calif., received the lowest bid for constructing 435 family dwelling units, from DeLuca & Son, Inc., San Francisco, Calif., at $1,079,000. G. E. Ellinger, Charles H. Lee and James H. Mitchell, San Francisco, are the architects.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 133.

OBITUARY

Homer Allen Frost, 68, of Tucson, Ariz., who until his retirement had been a civil engineer with the Great Northern railroad for 40 years, died Dec. 2 in Los Angeles, Calif. Mr. Frost was assistant superintendent of the Cascade tunnel construction project on the Great Northern, and at the time of his retirement was assistant valuation engineer for the road.

Albert Franklin Setzer, 62, Newton, N. C., building contractor, died Dec. 12.

William H. Virden, 90, retired building contractor of Reboboth Beach, Del., died Dec. 12. His firm, Johnson and Virden, did the concrete work on the Frankford elevated high speed line in Philadelphia, Pa., and paved streets in Buffalo, N. Y.

Chandler Schilling, 71, retired Youngstown, Ohio, and Baltimore, Md., contractor, died Dec. 15. In 1900 he helped build the first blast furnace for the Ohio Works, Youngstown. When Gary, Ind., was started, he went there to build the U. S. Steel Corp. buildings, and later the Jones & Laughlin Steel Co. mills at Woodland, Pa. He built the National Pike from Kirkersville to Etna, as well as other roads throughout Ohio and Pennsylvania.

William Henry Hunt, 76, former president of the National Brick Manufacturers Association and later of the Ohio Face Brick Manufacturers Association, and for four years president of the Cleveland, Ohio, Builders Exchange, died Dec. 16.

Douglas L. West, engineer attached to the National Research Council, Ottawa, Ont., died Dec. 15. Mr. West, a native of England, was graduated from the University of London and went to Canada 15 years ago.

Lloyd Raymond Smith, 61, chairman of the A. O. Smith Corp., Milwaukee, Wis., died Dec. 24 in that city. Mr. Smith studied engineering at the University of Wisconsin, leaving there at the end of 3 years to enter the industrial plant headed by his father, A. O. Smith. He became president of the company at the age of 30 and built it from a small plant to a $20,000,000 concern.

Cecil M. Ross, 58, died in Montreal, Que., Nov. 29. For 20 years he was an engineer with the Mathews Conveyor Co., and worked on the Canadian National Railways tunnel under Mount Royal. In World War I he was a captain in the Royal Canadian Engineers.

L. G. Tong, Jr., 65, construction engineer, Dallas, Tex., died Nov. 19. He was a graduate of Notre Dame University. He built many buildings in different parts of the country, including St. Paul's Cathedral, at St. Paul, Minn. He was government shipbuilding maintenance engineer at Newburgh, N. Y., during the first World War.

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Memphis bridge bids to be received Feb. 28

Bids for construction of the new 4-lane highway bridge across the Mississippi River at Memphis, Tenn., will be received Feb. 28, 1945, it is just announced. Advertisements asking for the bids will be published early in January. Setting of the date for receiving the bids followed the granting of definite priorities by the War Production Board for materials needed in the construction work.

E. H. Crump, Memphis, is chairman of the Memphis-Arkansas Bridge Commission, which was responsible for having construction of the $7,000,000 structure approved. The bridge will be located near the present highway and railroad bridge at the foot of Iowa Ave. Actual construction should start early in the spring.

WEEKLY CONSTRUCTION SUMMARY

CONTRACTS

Continental U. S. Only (Thousands of Dollars)

	Week Ending Dec. 30 1943	Dec. 21 1944	Dec. 28 1944
Federal	$19,674	$6,671	$15,659
State & Municipal	1,251	7,377	3,745
Total public	$20,925	$14,048	$19,404
Total private	7,255	6,177	3,746
TOTAL	$28,180	$20,225	$23,150
Cumulative 1944	(52 weeks)		$1,729,753
1943	(52 weeks)		$3,061,844

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1943 52 weeks	1944 52 weeks
NON-FEDERAL	$319,242	$450,141
Corp. Securities	22,431	112,919
State & Mun.	130,633	192,282
RFC Loans	15,045	61,940
FPHA Loans	3,133	
REA Loans	20,000	20,000
Fed.-Aid Hwy.	128,000	63,000
FEDERAL	$2,753,838	$1,263,800
TOTAL CAPITAL	$3,073,080	$1,713,941

ENR INDEX NUMBERS

Index base=100		1913	1926
Construction Cost	Dec. '44	302.30	145.32
Building Cost	Dec. '44	236.51	127.85
Volume	Nov. '44	74	33

MEETINGS

National

CANADIAN CONSTRUCTION ASSOCIATION, annual meeting, Chateau-Frontenac, Quebec, Canada, Jan. 15-17.

AMERICAN ROAD BUILDERS' ASSOCIATION, 42nd annual meeting, Stevens Hotel, Chicago, Ill., Jan. 16-19.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, Hotel Commodore, New York City, Jan. 17-19.

ASSOCIATED EQUIPMENT DISTRIBUTORS, 26th annual meeting, Edgewater Beach Hotel, Chicago, Ill., Jan. 22-24.

Regional and Local

ASSOCIATED GENERAL CONTRACTORS OF MINNESOTA, 26th annual meeting St. Paul Hotel, St. Paul, Minn., Jan. 11-13.

LOUISIANA ENGINEERING SOCIETY, annual meeting, St. Charles Hotel, New Orleans, La., Jan. 11-13.

OKLAHOMA SOCIETY OF PROFESSIONAL ENGINEERS, annual state meeting, Huckins Hotel, Oklahoma City, Okla., Jan. 12-13.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, midwinter luncheon meeting, Pennsylvania Hotel, New York, N. Y., Jan. 17.

PHILADELPHIA DISTRICT, AMERICAN SOCIETY FOR TESTING MATERIALS, symposium on magnetic particle testing, Hotel Benjamin Franklin, Philadelphia, Pa., Jan. 22.

NEW YORK STATE COUNTY HIGHWAY SUPERINTENDENTS ASSOCIATION, annual meeting, Albany, N. Y., Jan. 24-26.

NORTH CAROLINA SOCIETY OF ENGINEERS, winter meeting, Hotel Sir Walter Raleigh, N. C., Jan. 26-27.

WISCONSIN COUNTY HIGHWAY COMMISSIONERS' ASSOCIATION, annual winter highway conference, Schroeder Hotel, Milwaukee, Wis., Jan. 30-Feb. 1.

President Manuel Avila Camacho of Mexico, in his annual message said $3,500,000 had been spent during this year on public works in various municipalities, mostly for water and sewage systems. Special preference has been given to work on the Mexico City-Suchiate highway now open to traffic as far as Oaxaca City.

Work, he said, continues on the Mexico City-Juarez, Mexico City-Tuxpan, and Guadaljara-Nogales highways. He reports extensive construction of roadbeds for the national railways is going on between Cordoba and Suchiate, and Mexico and Laredo.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

The Nanking Train Ferry

Sir: There was one piece of my engineering work which may interest engineers in general. It was the Nanking train ferry which I advocated, designed, built and operated.

Nanking is situated on the south bank of the Yangtze River without any rail connection with the Tientsin-Pukow Railway just across the river. The width of the river at this point is about 3500 feet and the depth about 156 feet at low water. The rise of flood is usually 24 feet in summer time. Maximum surface velocity of current is about 10 feet per second. Traffic does not warrant the construction of an expensive tunnel or bridge.

In 1920 the technical department of the Ministry of Communication asked Chinese and foreign engineers to recommend schemes for a train ferry at Nanking. The writer presented the idea of an adjustable incline made of steel bridges linked together; but he did not succeed in influencing the authorities to adopt a new and untried scheme until ten years later when he was in charge of the Planning Division, Ministry of Railways.

The movable incline consisted of four steel bridge spans, each 150 ft. long, linked together, suspended by eight nickel steel screws and anchored at one end on shore. Operated by electric motors on top of towers, the screws adjusted the movable incline to suit the fluctuating water level.

In flood season, the deck of the ferry boat was 12 ft. higher than the shore, while in dry season, it was 12 ft. lower than the shore. The adjustable incline of 600 ft. accommodated the total range of 24-ft. difference of water level with a two percent maximum grade.

So they could be easily inspected and maintained without difficulty, tracks, bridges, operating machinery, etc., were all above water level. There were six rails on the first three single-track spans, while the fourth span flared out for three tracks to match the three tracks on the deck of the ferry boat. Switch points were laid on shore, not on the incline. There was a transfer table near the end of the boat to transfer a shunting engine from one track to another.

The special shunting engine, equipped with powerful brakes, was, in fact, a part of the boat. As soon as the boat docked, the shunting engine immediately pushed one section of cars to shore and brought back another section to the boat. Then the engine moved to the next track through the transfer table, and pushed another section of cars to shore. When the boat was fully loaded, the engine remained on the ferry.

Loading and unloading required 15 minutes, during which time water compartments with powerful pumps balanced the boat.

The train ferry was in operation from 1933 until 1937 when Nanking fell to the enemy. There had never been any accidents during the time of construction, nor any accidents during four years of day and night operation. Many bombs were aimed at the ferry by the enemy, but the ferry was never hit. The total capital investment was just completely amortized when the operation was interrupted by the war.

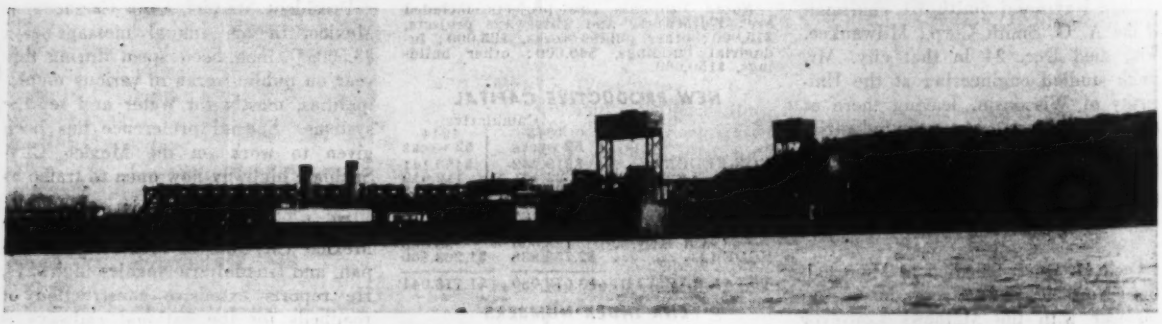
A few days before the fall of Nanking, the ferry boat steamed up-river for safety, together with the electric motors, machinery, two girder aprons, etc., dismantled from the adjustable incline. For years the Japs were not able to restore the service. The ferry boat is still safe and in good condition.

P. H. CHENG
Consulting Engineer
China

Architect-Engineer Cooperation

Sir: The two articles in your issue for Oct. 19, 1944, by Messrs. Creighton and Severud sound a most welcome note regarding cooperation between engineers and architects. The articles are especially valuable in illustrating, from actual experience, how this cooperation may actually be achieved in practice.

It is, perhaps, more than a mere coincidence, that in the issue of the *Journal* of The Institution of Civil Engineers for May, 1944, there is featured a paper entitled "Birmingham Civic Centre: the Work of the Architect and the Engineer on a Present-day Building Scheme." The paper was written by the Architect (T. C. Howitt) and the City Engineer of Birmingham (H. J. B. Manzoni) who acted as consulting engineer on all structural and mechanical aspects of the project. All who were interested in your article will find equal interest in this paper which illustrates the



To solve the problems inherent in a 24-ft. seasonal change in water level, a movable incline consisting of four, 150-ft., steel bridge spans were built to serve the Nanking train ferry.

actual details of cooperative work even more fully.

This logical, and important alliance of the two professions has been discussed in recent years by many leaders in the two professions but notably by Aymar Embury II in the U.S.A., and H. S. Goodhart-Rendel, a past-president of the Royal Institute of British Architects, in Great Britain. The latter has stressed that the key to this problem, as to so many others, is in the field of education. In a notable address to engineering students at Cambridge University, arranged by the Institution of Civil Engineers and published in their *Journal* (Vol. 17, pp. 334-348, 1941) Mr. Goodhart-Rendel said:

"Until young engineers acquire some knowledge of the science of planning, they can hope to see nothing but the gradual monopolizing by young architects of all planning, including that which is still left at the moment for engineers to do. Until young architects concentrate their too extensive survey of construction into a thorough practical understanding of the engineer's simpler tasks, they will give trouble and not aid to the engineers they work with."

As evidence of some progress in this direction, it may be pointed out that three of the four schools of architecture in Canada are parts of the engineering faculties of their respective Universities (Manitoba, Toronto, and McGill). In all these schools, architectural students take some classes in engineering subjects with students of engineering. The first regular year of study is, as from this session, the same for both architectural and engineering students at McGill University; at Toronto and Manitoba the differences in the first year are not very great. This cooperation in architectural and engineering education has been officially endorsed by the Royal Architectural Institute of Canada.

In course of time, such educational cooperation, and the publicising of such joint efforts as were described in your articles, will have the desired effect. In the meantime, engineers interested in building work can support to the maximum extent possible individual cooperative ventures and so eventually make it unnecessary (in the words of the lecture already cited) "to kill, by protest, by ridicule, by any lawful means whatever, the practice of calling in an architect to veil and disguise the barbarities of the engineer!"

ROBERT F. LEGGETT
Associate Professor of Civil Engineering
University of Toronto

Funds for Planning

Sir: In your November 2nd issue we have read with interest an article titled "Four States Help Finance Postwar Plans."

In this article you incorrectly note that New York State "pays one-half the cost of preliminary plans up to ½ of 1 percent for the detailed plans if the total cost of planning does not exceed 2 percent of the cost of construction."

The above Commission is authorized to advance funds for planning up to 2 percent of the estimated cost of construction based on 1940 prices. The allocation varies within this limit depending on the type of construction.

DONALD MCKINLEY
Chief Engineer
New York State, Postwar Public Works Planning Commission
Albany, N. Y.

Early Peruvian Levels

Sir: Recently in Huaraz, Peru, I was one of a small party conducted through the small museum, and here I discovered specimens of the hand levels in use prior to the rule of the Incas, long before the 16th century. The accompanying photos were made by a member of our party, Mrs. Patterson, wife of Counselor Jefferson Patterson, of the U. S. Embassy in Peru.

It is said that levels were controlled by filling the saucer-shaped bowl (Fig. 1) at the top with water or some other liquid. The stem is hollow but has no connection with the bowl. The stem has two crosses on both sides, as seen in the photograph; these were used, so I imagine, to sight through.

The cup-like object in Fig. 2 is claimed to be a level, but in my humble opinion it resembles nothing so much as a fancy drinking cup. What do you think?

EDWARD D. HOPKINS
Senior Sanitary Engineer
Pan American Sanitary Bureau
Lima, Peru

A Big Job Well Done

Sir: I should like to add my thanks to the others that you have probably received for the fine article by A. J. Boase, on the subject of construction work in South America (*ENR* Oct. 19, 1944, vol. p. 499). Our firm has done some work there, and this article and the program you have sponsored strikes us especially as filling a vital gap in the source of information and other pertinent data concerning design and construction of buildings in South America.

Mr. Boase appears eminently qualified to carry out your program, and you are to be commended for choosing him.

W. W. CALDWELL
President
Iglehart, Caldwell & Scott, Inc.
New York, N. Y.

Hand leveling devices are said to have been used by the natives of Peru before the time of the Inca rulers, probably long before the 16th century. Present Inca ruins, particularly the long irrigation ditches indicate that some type of leveling devices was employed in determining grades.

EDITORIALS

VOLUME 133 NUMBER 26

December 28, 1944

"Essayons"

EMBOSSED ON THE BRONZE BUTTONS of engineer officers of the Army is the motto of the Corps of Engineers—Essayons—"We will attempt it". As the old year closes and a new one dawns there are 700,000 men in the engineer troops of the armed forces, of whom over half a million are on this country's far-flung battle fronts attempting, and generally accomplishing, the seemingly impossible tasks set for them. No holiday spirit pervades the operations of these construction men. Theirs are hard, grim tasks.

From us at home they will ask but one thing in 1945—supplies and more supplies so that at no time will they lack materials or equipment to accomplish the tasks set for them in the time specified. The total value of engineer equipment alone will closely approach two billion dollars. Added to this must be food, clothing and fuel.

Let us, therefore, say to our half-million fellows overseas: Carry on! And by our actions let us prove that we also carry on by providing the supplies that are so vitally needed by men on the fighting fronts.

Bypassing the Bypasses

ALTHOUGH THE CONSTRUCTION of bypass highways around congested areas is an old problem of highway design, lack of proper planning has resulted in far too many instances where traffic on the original bypass became so restricted as to require the construction of a second highway to serve as a bypass for the first one. Principal cause of this confusion often was the lack of engineering foresight or lack of legislative authority to control access to the bypass. Both residential construction and commercial development generally are attracted to an area traversed by a new highway. As this development continues, access streets are built indiscriminately, vehicle and pedestrian cross-traffic increases to the point where traffic control is necessary on the bypass itself, and the entire improvement becomes merely another congested thoroughfare, which in time will have to be bypassed if through traffic is to be expedited. Postwar planners can avoid these errors by purchasing sufficient right-of-way to permit the future construction of service roads paralleling the bypass, or by buying all access rights at the time of construction. By investing a little more money in right-of-way, future access traffic can be controlled and the bypass highway will continue to serve its intended purpose.

Cheaper Snow Removal

BY FAR THE GREATEST ITEM of expense in municipal snow-fighting activities is removal and disposal of the piled-up material. Loading and trucking to disposal points adds a sizable item to the total. Of particular interest, therefore, to the municipal official who seeks economy in snow removal are the flushing and "sewering" practices used in New York City and mentioned elsewhere in this issue. It should be recognized, however, that flushing of city streets to remove snow is limited to situations where above-freezing weather is certain during and following the operation; furthermore, there is no economy if the sewers terminate in a disposal plant where all the flow must either be pumped or treated. Nevertheless, snow flushing and sewering if used in coordination with usual disposal practices, can be adapted to local conditions with attendant relief to machine and manpower shortages as well as to city budgets.

Supplies Over the Beaches

CONSTRUCTION MEN in the armed forces, in their most elaborate seafaring venture, that of building artificial harbors for the Normandy invasion, met a great deal of grief but through grit and ingenuity were able to deliver materiel rapidly over the beaches despite almost complete loss of the major equipment developed for the operation. The artificial harbors were planned for the contingency that the first severe storms of winter would wreck them and the operation was scheduled for a time when, normally, there would be no storms of large magnitude. However, a storm of full winter severity did occur during the construction period, and as was expected, wrecked a large part of the installation. Despite the hell of enemy action and rough water, supplies had to be, and were taken ashore. Seabees and other navy units salvaged part of their beach installations; Army Service Forces, particularly the Engineers, had a most important part in moving materiel over the beaches under "impossible" conditions. The fact that a storm wrecked the artificial harbors ahead of schedule can in no way detract from the achievement of the British engineers in envisioning and building the great

units or of the accomplishments of our own engineers in installing them and subsequently revamping the means of delivering supplies essential to the success of the invasion.

License Law Defects

THE ENGINEER LICENSE LAW in Illinois was declared unconstitutional some time ago in a sweeping decision which is reproduced in large part in this issue. That decision is of wide interest to engineers because the defects found in the Illinois law are common to many state license laws.

The Illinois Supreme Court found the state's license law defective on many counts, three of which are basic to most engineer license laws. The court found the definition of the practice of professional engineering so all-inclusive as to be unenforceable, objected to provisions that permitted the issuing of a blanket license to an engineer to practice in all fields of engineering regardless of his qualifications, and held the law to be unconstitutional because it delegated to the licensing committee the power to determine what the license qualifications should be rather than stating them specifically in the act itself.

The definition used in the Illinois law was taken from the so-called model law. That it is all-inclusive is no chance happening. It was made so deliberately by those who wrote it because they wanted a definition so broad that all engineers would have to have a license. Drafters of the license laws hoped thereby to unify the profession by bringing in all engineers under one law.

Similarly, the blanket license was designed primarily to unify the profession. It was justified on the ground of simplicity, also on the claims that the fundamentals of all engineering are the same and that a man trained in those fundamentals would know his own limitations and would not practice a branch of engineering in which he is not qualified. In effect the drafters of the model law made the license a certificate of character rather than one of competence.

Concerning the provisions of the act relating to licensing the Illinois court said: "No one can determine whether he comes within the act by reading it. No one can determine from the act the necessary requirements to entitle him to examination or to obtain from the [licensing] committee its opinion that he has satisfactorily met the requirements of the act. . . . The committee may apply one standard to some applicants and another standard to others."

Here again, the Illinois law was not unlike most license laws in its indefiniteness. This vagueness of most laws finds its origin in conditions met by the drafters when the laws were first being promoted. They could not then make the requirements broad enough to match their all-inclusive definition without building up too much opposition to the laws. Further, they had in mind raising the requirements progressively over a period of years once the laws were on the statute books. This is precisely what has been done in several states. It could not have been done had specific requirements been written into the laws.

When the Illinois Supreme Court said the licensing committee could apply one set of standards at one time and another at other times it put its finger on one of the major defects of most if not all state license laws. That has been done in the practical application of the laws.

If questions raised by the Illinois decision are approached realistically there is no reason for concern over its effect on license laws generally. Most states now have license laws, and the licensing principle is quite universally accepted. Therefore some of the obstacles that stood in the way when the licensing movement started have been removed. The idea that an all-inclusive license law is needed to unify the profession should be abandoned. It has proved to be an illusion. Licenses should be required only for those activities involving life, health and property; consulting, planning and evaluating should be left out of the new definition Licenses themselves should be classified into the major subdivisions of engineering; and, finally, the requirements for a license in each subdivision should be clearly set forth in the act.

Most of these proposals will not be acceptable to many men who have had an active part in developing our license laws. Acceptance of them immediately is not necessary, except possibly in the case of Illinois, yet acceptance of them would be a safe defensive measure against future attacks for which the way has been cleared by the Illinois decision. The license laws have served and can continue to serve a useful purpose. The best way to protect them is to eliminate their weak points.

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Fig. 1. Dumping snow into sewers by use of machines and hand labor is one of the cheapest methods of disposal.

Municipal Snow Fighting—A Symposium

***Editor's Note**—Experiences in six municipalities with snow removal were presented at a round-table discussion sponsored by the New York-New Jersey Metropolitan Chapter of the American Public Works Association. The participants, representing large and small communities from different parts of the metropolitan area where topographic and other conditions create a variety of problems were: John Austin, assistant engineer, Bureau of Street Cleaning, Newark, N. J.; Walter Brennan, superintendent of highways, Port Chester, N. Y.; F. M. Galloway, acting city engineer, Montclair, N. J.; William J. Powell, deputy commissioner, Department of Sanitation, New York City; J. J. Smith, superintendent of public works, Glen Rock, N. J.; and Percy B. Sprague, superintendent of public works, Valley Stream, L. I. Edward J. Cleary, managing editor of ENGINEERING NEWS-RECORD, served as moderator of the discussion, of which the following represent typical questions and answers.*

Moderator—Municipal snow cleaning and removal is like fire fighting—it is always an emergency activity, yet we know that it will occur with more or less frequency. Therefore, preparations must be made in advance. These preparations call for: (1) development of a detailed plan of action; (2) creation of an organization to execute the plan; and (3) the adoption of operating procedures.

This discussion is designed to exchange information and experiences pointing to more efficient snow removal practice, the importance of which cannot be underestimated. To municipal administrators and public works officials, snow removal is a major problem. And to the user of city streets it is a service without which there would be a temporary paralysis of almost all activity. In this connection we need only reflect on the consequences resulting from the curtailment of fire and health protection, food distribution and general transport facilities.

Q. It is of primary importance to develop a plan of action. What has Newark done in this regard?

A. Our work starts in the summer, when general plans are made for dividing the city into districts and organizing units for specific tasks. Personnel and equipment from the Bureau of Street Cleaning serve as the nucleus, to which are added personnel from other bureaus, such as parks and public works. In the fall, all the men are called together for general instructions and definite assignments are made. Each man is advised where to report, and told to be on hand as soon as one inch of snow has fallen.

Q. Does Port Chester, a city of 25,000, contrasted with Newark's 450,000 population, plan in the same general way?

A. We have only about 45 mi. of streets to plow as compared to Newark's 356 mi. However, all arrangements are made by Oct. 1; plows are equipped and put on trucks, and the men are instructed regarding duties and routes.

Q. What is done in Glen Rock, a town of 6,000?

A. In late October plow equipment is put on the trucks. We have three trucks, and each is assigned a 15-mi. section of the town. We go out when snow is 3 in. deep, and stay with the job until it's finished. Our organization is small—only three drivers and three helpers.

Q. What is done in New York City to cope with its complex task, not the least of which is cleaning snow from 4,000 mi. of streets?

A. A personnel of 10,000 is kept on call in the five boroughs of the city. In the last week of November, one-third of that force is assigned to night duty. The city is divided into 60 districts, each supervised by a superintendent. Plow routes are laid out in advance and printed copies of instructions are placed in the trucks. Plow routes depend on the density of traffic and vary from 1½ to 5 mi. In outlying sections the routes average 5 mi., but in midtown Manhattan, where traffic is heavy, only 1½ mi. are covered. Each plow traverses the entire route at least once every two hours.

Training schools are conducted under supervisors who are familiar with the operation of all equipment as well as with special difficulties (bridges, for example) on certain plow routes. Special units are trained for bridge and express highway routes. Then we also conduct "short courses" at Lake Placid in upstate New York, where men are trained in the operation of Snogo machines. This equipment is expensive and rather than run the risk of having the machines damaged at a time when they are vitally needed we provide pre-season instruction. Lake Placid has snow a month or so before New York City.

Q. How is snow removal financed?

A. In Valley Stream, L. I., which has a population of 20,000 and 80 miles of street, it is the policy to include $3,500 for snow removal in the annual budget. However, this is an arbitrary figure—expenses may run more or they may run less. If they are more the amount is carried over into next year's budget. But our experience shows that $3,500 is ample. Removal costs average about $10 per mile, which includes carting snow from three business areas as well as from around public buildings.

In Montclair the budget appropriation is $10,000 for "storm damage": this includes snow removal and hurricane damage. It costs about $10,000 to take care of four snow storms in this city, which has a population of 45,000 and some 80 mi. of streets. If more money is needed an emergency appropriation is then made.

In New York City the appropriation is about $2½-million. Costs vary widely; last year we averaged $30,000 an inch of fall, but on one occasion it was $100,000 per inch.

Glen Rock needs about $500 a year; amounts over this are carried over in next year's budget.

Port Chester gets along with about $800 for its 45 miles of streets. Some $500 is put in the budget just for buying shovels, salt and sand. Additional costs are carried over in the next year's budget. We estimate a cost of $350 per inch of snowfall; but sometimes a "cold" storm with 6 in. of fall will cost up to $2,500.

Newark makes a budget appropriation of about $70,000 for snow removal. If this amount is exceeded, an emergency appropriation is made, but we have been below $70,000 for the past few years. This fund covers every phase of snow removal, and it is not used for any other purpose.

Q. What do you do about the parked car problem?

A. Parked cars are the major problem in New York. We cannot do a complete job of plowing until the automobiles leave the street, which is late at night. And in a heavy storm thousands of cars without skid chains get stuck and interfere with our work. Radio announcements are used requesting cooperation by the public and this has been helpful.

Newark finds it difficult to plow to

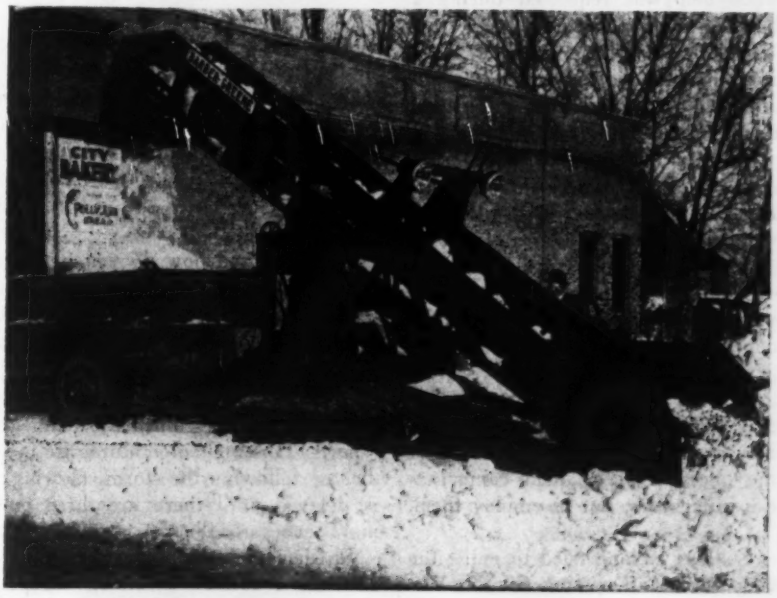


Fig. 2. Mechanical loaders make possible the quick cleanup of snow piles and assure maximum use of trucks. Here are shown two of the several types of loaders that are widely used.

the curb because of the large number of cars parked along the sides of the streets. It is questionable whether a "no parking" ordinance during snow storms would be effective in combatting this situation.

Q. What arrangements are made with local contractors or other private organizations to supply equipment and labor?

A. Montclair deals with four contractors with whom stand-by contracts are made. Their trucks are readied for mounting plows and we call on them as needed. They are reimbursed on an hourly basis, but if they should not be called at all during the season they receive a stand-by fee of $25 per plow.

In New York competitive bidding is used for contract snow removal. The city is divided into six contract districts where additional men and equipment are made available; however, they have not been called out for six years.

Newark has 88 extra plows available that are mounted on contractors' trucks. Plowing is paid for by the hour, and there is also a stand-by rate. Contractors' trucks are hired to aid in carting snow.

Q. Where do you get extra labor in these days of manpower shortages?

A. We can't find any extra help in Port Chester. Nobody responded when help was requested during a business-day snowstorm last year. When it snowed on a Saturday boys from the local high school were available and willing to work. We paid them 60c. an hour.

In New York we start registering men on Nov. 1 and continue until Dec. 1. During the depression we were able to get 25,000 registrations, and we could easily pick up an additional 18,000 during a storm. This year only 350 registered, so we must depend on motor equipment.

In Newark last year a few service men from a nearby airport asked if they could work on their off time. However, it was decided, because of the question of accident compensation difficulties, not to employ them.

Q. Has anyone tried to enlist the cooperation of existing Civilian Defense organizations to provide help?

A. During the hurricane in Port Chester last fall we tried to get the OCD men out, but they had a variety of excuses for not showing up.

We did not have much success in New York City, either.

In Valley Stream I happen to be deputy director of Civilian Defense, and we pride ourselves on being a pretty good outfit. However, when I asked for volunteers for other work the group response was: "We volunteered for a particular job, and that is what we are going to do, and nothing else."

In Montclair no effort is made to organize or use volunteer groups. We extend the hours of regular personnel when we have to and when we need extra help we draw on fire and police department manpower; we pay the latter the regular public works department rate of 78c. to $1.25 per hour.

Q. How do you compensate workers for overtime and what arrangements are made for eating periods?

A. In New York time and a half is paid after 8 hr. work and each shift works 11 hr.; two 20-min. rest periods are provided during which the men eat, and this time is not deducted. During severe storms the Women's Auxiliary supplies coffee.

In Montclair salaried men are not paid for extra work but they are allowed expense money for meals. Other workers are permitted a half hour period for eating.

In Glen Rock men are paid from the time they start until they finish with the shift, and this includes time out for meals. During night work coffee and sandwiches are provided. Valley Stream operates in the same way, with no formal rules to prevent men from taking time out for coffee and snacks.

Q. When and how do you plow?

A. In Valley Stream plowing is started after a fall of 2 in. On both wide and narrow streets the snow is pushed as close as possible to the curb.

Port Chester is guided by weather reports. If rising temperatures are indicated following the storm, plowing is delayed until there are three or more inches of fall.

In Glen Rock the plowing schedule calls for 4 cuts on all streets except those in the business section, where the snow is shoved to the north or warm side of the thoroughfare.

In Montclair the main streets are tackled first. The routes are so laid out that the plow trucks do not have to back or turn around. A truck going down one street turns into succeeding blocks until eventually it ends up at the place it started from and is then ready to make a second run. Straight blade plows are used.

In Montclair all streets are plowed full width except a few of the narrow residential streets, which receive only 3 cuts. We don't gamble in December and January with light snows of 3 or 4 in.; these falls are cleaned away because if a thaw occurs, followed by freezing, then troubles are multiplied.

Q. What is the policy in regard to property owners cleaning walks?

A. Newark does not clean sidewalks; property owners are required to do this. If they are delinquent the Bureau of Streets removes the snow and sends a bill to the owner.

Valley Stream has an ordinance that compels people to clean their sidewalks and this ordinance is observed fairly well. No attempt is made to enforce it in the residential district, but we do in the business sections. Garden City, L. I., is one of few communities in the area that plows sidewalks.

Port Chester cleans sidewalks in the business district, but in the residential areas property owners are required to care for their walks.

Q. How do you dispose of snow?

A. New York uses mechanical conveyors and Snogos, which load snow into trucks that dump into rivers. The cheapest method, however, is to "sewer" snow, and about one-third of it is handled in that fashion. Best results are obtained if the sewer carries a pretty good flow. Ordinary manhole openings are large enough to handle the snow, which is dumped nearby and hand-shoveled or bulldozed into the opening.

Valley Stream and Glen Rock depend entirely on hand loading. Montclair uses Snogos.

Newark employes both hand loading and mechanical loading, the latter being done with 22 Nelson and Barber-Greene loaders. Snow is dumped into the Passaic River, but a small amount is put into sewers. Many of the sewers have flat grades and extra care must therefore be ex-

ercised in their use for snow disposal.

Q. How did you minimize slippery conditions caused by packed snow or ice?

A. Newark places reliance on salt. Three road spreaders, each carrying about 7 tons of salt, are equipped with a revolving disk mechanism that throws the salt over a 30-ft. diameter; we also use small Butler spreaders. The amount of salt spread is about ½ to ¾ lb. per square yard of pavement. We have "licked" 8 and 9 in. of snowfall in the center of the city with salt spread early during the storm.

In Port Chester the principal thoroughfare is the Boston Post Road, which carries very heavy truck traffic. We cannot plow until the early morning hours, by which time the snow is packed hard. It has been found helpful to put salt on this highway during the day so that the snow is softened up when the plow goes into action.

New York used 47,000 tons of rock salt last year; of this amount we got 40,000 tons for nothing—it came from ships traveling in ballast from the Mediterranean.

Q. Have you found that salt affects pavements?

A. New York City engineers state that it is not wise to use salt on concrete pavements before the pavement has aged for three years.

For that reason it was not employed on our new express highways until they were properly aged.

William Raisch, consulting engineer to the Borough of Queens—I would like to verify what the Commissioner said about scaling. Scaling resulted on express highways when salt was used, and its use was abandoned. We also found on Queensborough Boulevard that concrete curbs were damaged, some of them disintegrating completely. But I don't think this is the result of salt on the concrete, but rather the alternate freezing and thawing, which resulted from changes of temperature. A lot of the salt-mixed snow melted because of the continuous passage of cars, and the water ran into the curbs, where it stood for a long time. We must replace of lot of our curbs because of this damage.

I. J. Casey, Town Engineer, Irvington, N. J.—We have had no trouble from the use of salt. All our concrete roads are at least 7 years old. They were laid with fine aggregate top, and the surface remains unscarred.

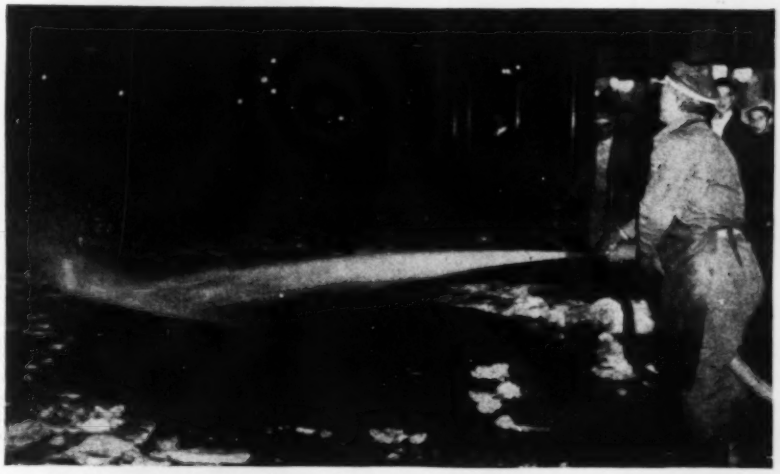


Fig. 3. Hosing with 1-in. nozzles has been found effective in New York City for the removal of light snow where temperatures are above the freezing point.

In Valley Stream screened sand and calcium chloride (100 lb. per ton of sand) are used for slippery conditions. This does not affect the pavements and no scaling has been noticed on concrete.

Glen Rock uses cinders mixed with calcium chloride (50 lb. per ton of cinder). There has been no damage whatever on the streets.

Newark finds that broken stone (¼ in. screenings) is preferable to sand for icy streets. Sand blows away and is ineffective.

Moderator — Will Mr. William Raisch, program chairman and consulting engineer, close the discussion with a brief summary?

Mr. Raisch—I am amazed to note the wide variation in the cost of snow disposal. In one case we find it to be 30¢ per inch mile, and in contrast I calculate from data presented that New York has spent up to $25. If you can dispose of snow through sewers simply by hosing it, this seems to be cheapest. But when you require trucks for disposal, the cost goes up.

I also note that regardless of size, every community anticipates storms and makes arrangements and plans that will be effective at a moment's notice. The importance of advance planning is dramatically evidenced by the situation in New York City where as many as 48,000 men, 3,200 trucks and 1,400 plows may be used in combating a single storm.

Finding temporary labor these days is a major problem. Port Chester has found a partial solution by hiring high school boys when they are available. In some cases I note that soldiers off-duty might be used. Securing help from the personnel of other city departments has much merit. And it seems that no dependence should be placed on the idea that civilian defense organizations might be used as a source of volunteer labor.

Concerning the matter of parked cars, it seems that this might be handled with police department cooperation through enforcement of emergency non-parking measures before and during snowstorms. Radio warnings, too, might be used more widely to gain the cooperation of the public.

There are a great many differences regarding the use of salt. I believe that in Queens our troubles result primarily from the fact that moving traffic sprays the brine solution against the curb. We also have complaints from people who park their cars on salt-treated streets—they claim that the paint and finish on their cars are damaged.

May I conclude by stating that this discussion provided a liberal education on snow removal. And for more information on the subject I recommend *Bulletin* No. 6, "Municipal Snow Removal and the Treatment of Icy Pavements", published by the American Public Works Association. (Editor's Note: Copies are available from the Association, 1313 East 60 St., Chicago, Ill., at $1.00.)

Special Rig Pulls Twisted Sheetpiles

Contents in Brief—Steel sheetpiling, whose butt ends were severely split and twisted in driving, created a difficult removal problem. Some of the piling in a cofferdam at a Chicago filtration plant was pulled with a 50-ton capacity floating derrick. Piling tightly embedded required as much as a 150-ton pull, provided by a special A-frame rigged on one end of a barge.

EVIDENCE of the terrific beating often inflicted on steel sheetpiling when driven in a cofferdam is clearly shown by the battered and buckled ends of some heavy piling pulled recently at Chicago's South District filtration plant. The piling was driven originally in 1939 to form a part of the mile-long cofferdam or bulkhead enclosing 38 acres of reclaimed land comprising the plant site. (*ENR* June 18, 1942, vol. p. 1020.)

Of a total of 460 piling removed only 60 showed extensive damage, although several more were bent and battered. The lower ends of the 60 piles showed various forms of rupture as indicated in the accompanying photographs. Some split down the middle with the two pieces taking a corkscrew twist. Some split without twisting or curling, while others buckled or became badly battered and bent. The damage done to the piling during driving resulted from the peculiar formation of the lake bed and from the piling hitting large boulders. Some boulders excavated from within the bulkhead were roughly 8-ft. cubes.

Removal of this piling, averaging 42 ft. long and weighing 36 lb. per lin. ft., constituted a part of a construction contract that called for the removal of the entire portion of the bulkhead located directly in front of the shore intake of the filtration plant. The remainder of the mile-long bulkhead was left in place to protect the plant site from infiltration of ground water and from excessive wave action of Lake Michigan. As originally constructed, the bulkhead extended 1,600 ft. out into the lake on two sides and 1,050 ft. roughly paralleling the shoreline.

Piling driven to bedrock

Piling had been driven through a clay core deposited on the lake bottom in 21 ft. of water and then through 7 ft. of sand and clay and 6 ft. of hardpan containing occasional boulders. In some instances there was a stratum of water-bearing sand and gravel containing boulders between the clay and bedrock. The driving of all piling to bedrock was considered necessary as the cofferdam enclosed such a large area and had such a great length exposed to water pressure from the lake, that no chances could be taken regarding its water-tightness.

Driving through the hardpan to rock was extremely difficult but in most instances the 42-ft. piling was driven to design elevation, with their tops 8 ft. above the lake level. In constructing the cofferdam heavy riprap was deposited on the outer or lake side of the clay core and steel piling cutoff wall, and lighter stone was deposited on the inside. That the cofferdam, as designed and driven, was watertight was evidenced by the fact that one 50-gpm. pump was able to keep the 38-acre enclosed area dry. Even then there was no evidence of leakage through the cofferdam, most of the water was from seepage from springs on the bed of the lake.

Some 600 lin. ft. of steel sheetpiling cutoff wall and 30,000 cu. yd. of clay core and rockfill cofferdam were removed from in front of the shore intake to the filtration plant. Work on this contract was started last May and completed on Aug. 20, with work proceeding in two 8-hr. shifts daily.

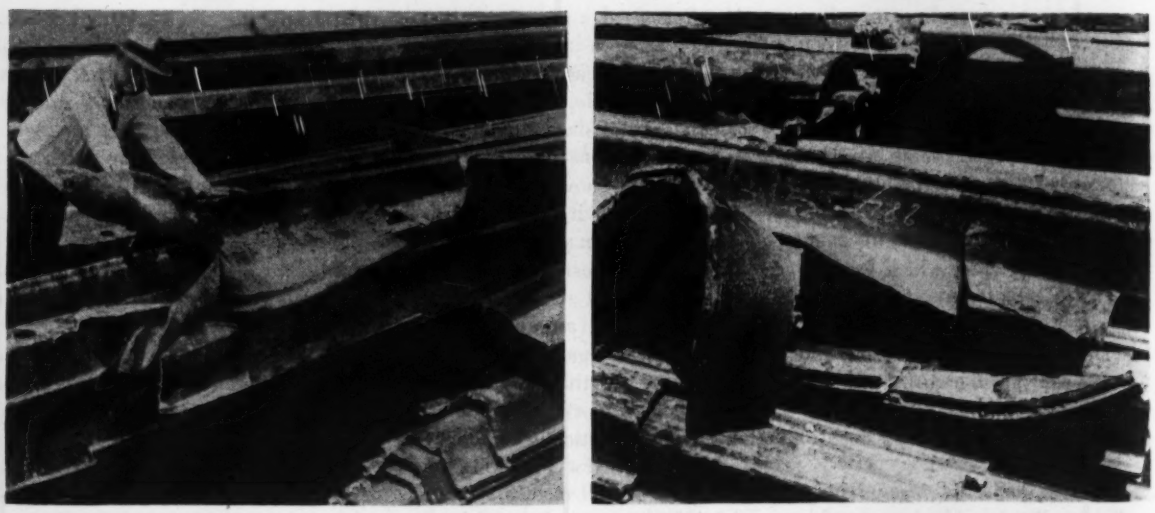


Fig. 1. An unusually tough pile-pulling job was experienced in extracting this split and twisted steel sheetpiling, driven five years ago, from a cofferdam at Chicago's South District filtration plant.

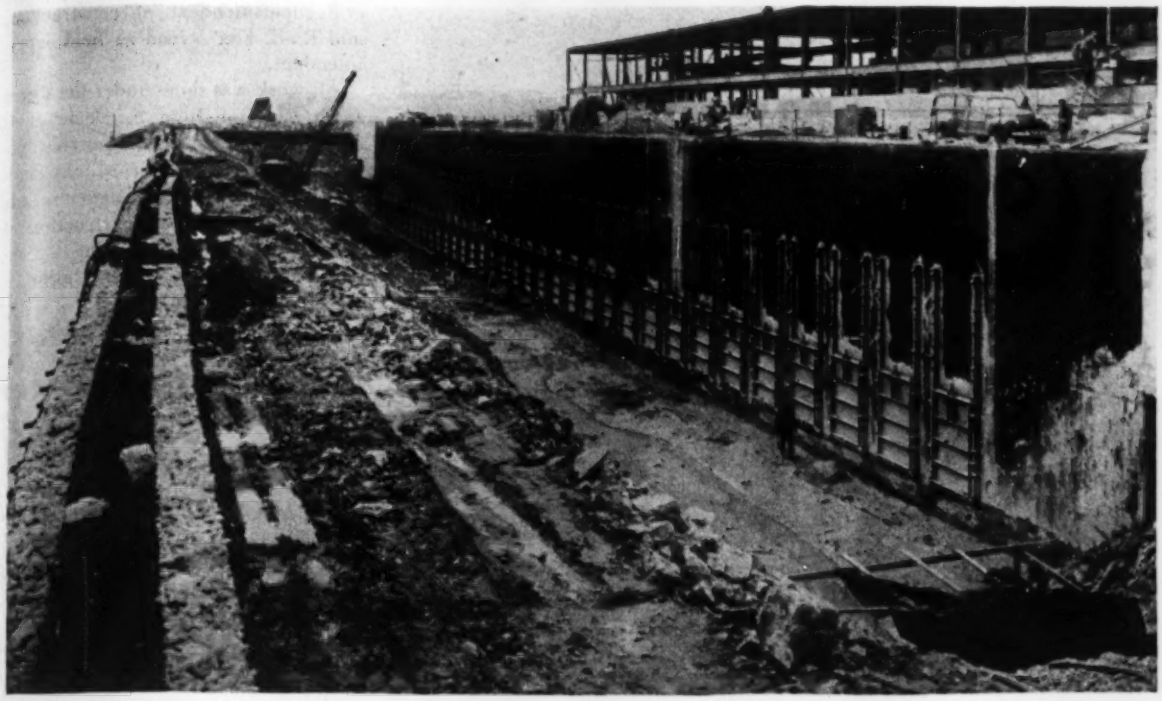


Fig. 2. About 600 lin. ft. of the steel sheetpiling cutoff wall at left, and 30,000 cu.yd. of clay core and rock fill cofferdam were removed from in front of the shore intake at the Chicago filtration plant.

After the 34 intake gates at the filtration plant had been securely sealed to prevent inflow of lake water, some 10,000 cu. yd. of fill was removed from the inside face of the bulkhead, between the sheetpiling and the intake gates. This material was excavated by dragline, loaded into trucks and deposited west of the filter plant for fill.

Lake pressure equalized

Excavation in the dry inside the bulkhead could be carried only to the point at which the lake pressure outside of the bulkhead might overturn the piling, inundate the remainder of the bulkhead and increase the difficulty of removing the piling. At this stage of operations, a floating derrick barge was moved onto the job outside of the bulkhead, and the line of piling cut to permit flooding of the area between the intake structure and the cofferdam—thus equalizing the water pressure on both sides of the bulkhead. The remaining 20,000 cu. yd. of clay core and rock fill forming the bulkhead were removed with an 8-cu. yd. dipper dredge.

Starting at the north end of the line of piling to be removed the sheets were extracted one at a time. Equipment used for this work included a steel floating derrick capable of handling a 50-ton load with a 100-ft. boom. In extracting the piling this boom was kept at approximately a 60-deg. angle, from which a heavy pile extractor was suspended by a four-part $\frac{1}{8}$-in. steel hoisting cable, which in turn was run to a triple drum steam hoisting engine that developed a 75-hp. pull on a single line.

Attachment of the pile extractor to the steel sheetpiling was by two 6-in. wide by 1-in. thick steel plates placed on both sides of the web of the piling and attached to both the sheet and the extractor with two 2-in. bolts. This equipment was used to extract the first 150 piles, with the pulling becoming progressively more difficult until such time that the piles could not be moved. During this operation, under extremely heavy pulling, some holes in the piling tore out and new holes were burned for connections.

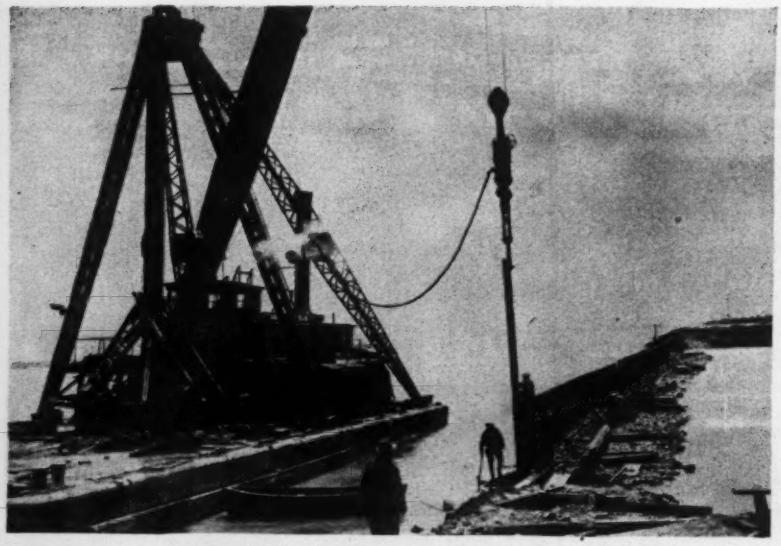
Heavy equipment required

Some piles could not be "started" by the method described. When the derrick failed to move the pieces that were tightly embedded in rock the method employed was radically changed by the contractor.

A timber A-frame consisting of 16x16-in. timber legs and head piece was erected on one end of an all-welded steel deck scow 135 ft. long, 36 ft. wide and 9 ft. deep. The top of the A-frame was guyed to the other end of the scow with two $1\frac{3}{4}$-in. steel hoisting cables. The timber legs of the A-frame were bolted to a 16x16-in. sill timber which in turn was bolted to the deck of the scow and securely braced with 4x12-in. timbers. This scow, as equipped, was good for a 250-ton pull from the head of the A-frame.

The scow with the A-frame was placed at right angles to both the line of piling and the steel derrick, with the A-frame positioned directly over the pile to be pulled, as shown in Fig. 3. The pile extractor was suspended from the A-frame head with a $\frac{7}{8}$-in. steel hoisting cable through an 11-part block and falls. The line was run through a heavy sheave at the foot of the A-frame and snatch blocks to the steam hoist on the steel floating derrick.

A number of piles were extracted by this rig with a pull of about 100 tons. When the pull was increased to 125 tons the bolts in the head of the extractor sheared off and it was necessary to replace them with a special cradle, using steel straps 8 in.



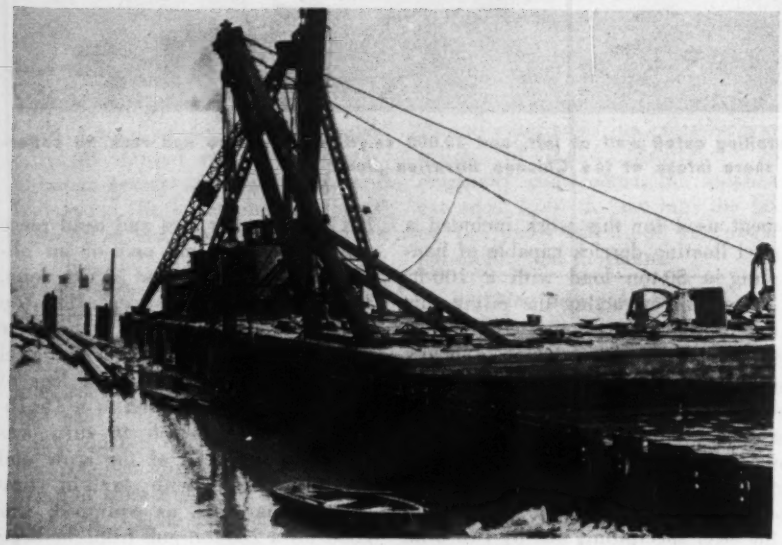


Fig. 3. Some piling were pulled without difficulty with the 50-ton floating derrick (above) but those more tightly embedded required as much as a 150-ton pull, provided by the A-frame equipment shown below. Sloping watermark on A-frame barge indicates submergence at heavy pull.

wide and 2 in. thick on both sides of the extractor. During one of the hardest pulls, one of the 1¾-in. guy cables from the top of the A-frame broke, but fortunately did not cause severe damage.

An estimated 150-ton pull was required to remove the most difficult piles. The 150 tons was calculated by the amount of water displaced by the barge as indicated by the water mark, which came to within 1 ft. of the top of the barge at the end supporting the A-frame.

So difficult was the extraction of some piling that the contractor contemplated burning them off at about 24 ft. below lake level. This was not feasible, however, since the contract stipulated that all piling be salvaged and turned over to its owner, the City of Chicago. Neither was it possible, at that time, to purchase new piling to replace those cut in two.

Engineering personnel

A contract for removal of the steel sheetpiling core and bulkhead from in front of the South District filtration plant was held by the Fitz Simons & Connell Dredge & Dock Co., Chicago. John J. Roach was general superintendent of construction, and R. E. Fox served as field superintendent.

All work was done under the direct supervision of John S. Dean, engineer of waterworks construction, reporting to W. W. DeBerard, city engineer of Chicago. Carl Riggenbach is resident engineer of construction at the filtration plant and John R. Baylis is engineer of water purification.

Hydro Plant Eases Mexican Power Shortage

A hydro-electric power plant recently placed in operation at Ixtapantongo, Mexico, is expected to relieve the acute power shortage in the Mexico City area. The 31,000-kw. plant will be followed by two others at nearby El Durazno and Santa Barbara as part of a two-year program aimed at providing a total generating capacity of 150,000 kw.

Officials of the Mexican Federal Power Commission, which built the Ixtapantongo station from the proceeds of a special 10 percent tax levied on electric power consumers in the Mexico City area since December 1938, have announced that equipment for the second plant is now being assembled in the United States and may be ready for delivery and installation by the middle of 1945. When completed, the three units will form the first large hydro-electric project constructed by the Mexican government.

Sources of the energy to be tapped by the project are the Malacastepec, Tilostoc and Valle del Bravo rivers. The water is to be impounded by dams at Villa Victoria, El Durazno and Colorines. It will be conveyed to the first dam by a 11,810-ft. canal, a 1,115-ft. tunnel and a 10-ft. dia. pressure conduit 282 ft. long.

While the hydroelectric system described will make a substantial contribution to the development of industry, mining and agriculture in the central part of Mexico, much more capacity will be needed. Consequently, the Mexican Federal Power Commission is planning to spend about $9,000,000 on power plants in the near future. Most of this sum is to be derived from the consumer tax on electricity, which produces about $6,000,000 yearly.

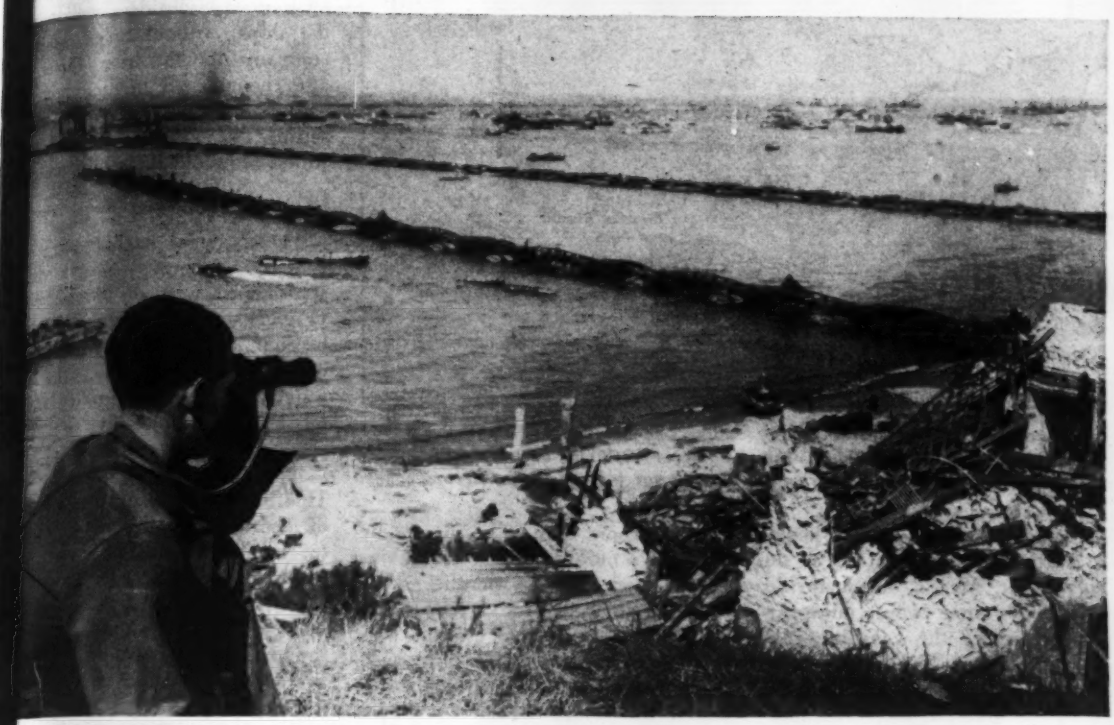


Fig. 1. "Omaha" beach on the day before the great storm wrecked its breakwaters and landing bridges.

The Seabees in the Normandy Invasion

...or's Note—Written by a Civil Engineer Corps officer of the Navy, ...ersant with all of the planning and construction details, this article is an ...oritative account of the installation of the famous artificial harbors and ... operation of the Rhino ferries and pontoon causeways which were ... Seabees' responsibilities in the invasion of France. Although most of ...spectacular elements of the harbor facilities were destroyed by a storm ...re they could be put to use, this in no way dims the achievement of ... installation.

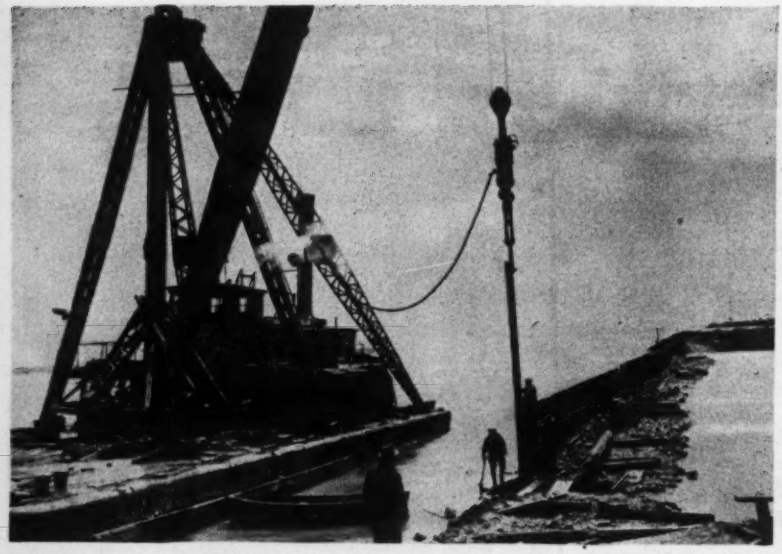
...ns for the coming invasion of ... European continent had taken ... shape by the summer of 1943. ... Navy's role was primarily that ...ssuring a successful landing on ... French coast, providing the land- ... facilities necessary to permit the ...nterrupted delivery of great num- ... of troops and vast quantities of ...erial, and maintaining an open ...ply route across the English ...nnel.

...he coast of Normandy where the ...sion was to take place is char- ...rized by flat, sandy beaches, with ...average slope of 1 to 150, and an ...rage range of 21 ft. between high and low tides. It was clear that even if all the French ports fell into our hands undamaged at an early stage of the operation the quantity of stores to be landed for the maintenance of the invasion force would exceed the port capacity available. This meant that supplies would have to be landed over the beaches while ports were being improved. It was estimated that the quantity to be put ashore in this manner amounted to about 12,000 tons and about 2,500 vehicles per day for at least the first 90 days, even in the event of bad weather.

The means adopted to meet this difficult problem was breath-taking in its boldness. It was decided to prefabricate in England the port facilities that would be needed, to tow them across the Channel with the invading forces to the coast of Normandy and to install them there at the time of the assault!

Two principal artificial harbors, one British and one American, were involved, and it is now well known that shortly after the American installation was completed it was wrecked by a gale of unprecedented severity. The British harbor, not being at such an advanced construction stage and being located in a slightly more protected area, could be repaired after the storm, and was finished to function as planned. This article relates the story of the American installations whose tragic fate does not detract from the engineering achievement represented by their construction.

Assaults were to be made by American forces at two points on the Normandy coast (Fig. 2), one on the



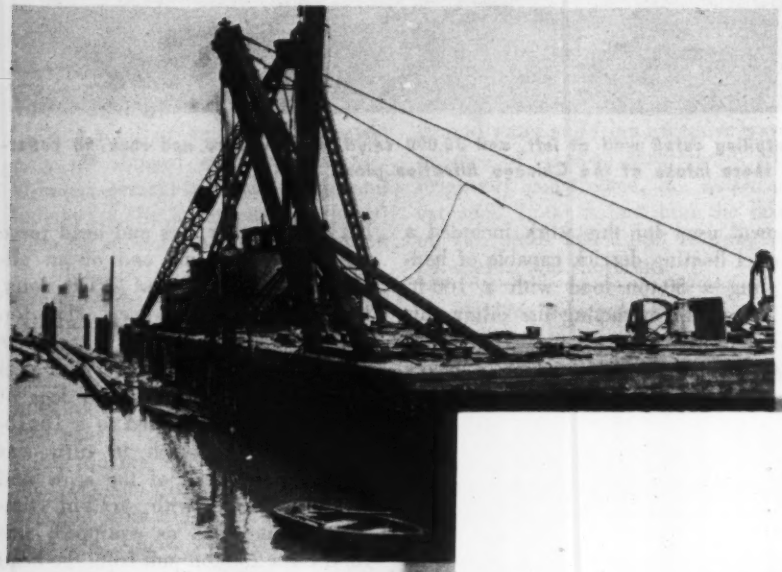


Fig. 3. Some piling were pulled without difficulty (above) but those more tightly embedded required the power provided by the A-frame equipment shown below. Sinking of barge indicates submergence at heavy pull.

wide and 2 in. thick on both sides of the extractor. During one of the hardest pulls, one of the 1¾-in. guy cables from the top of the A-frame broke, but fortunately did not cause severe damage.

An estimated 150-ton pull was required to remove the most difficult piles. The 150 tons was calculated by the amount of water displaced by the barge as indicated by the water mark, which came to within 1 ft. of the top of the barge at the end supporting the A-frame.

So difficult was the extraction of some piling that the contractor con-

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eral superintendent of construction, and R. E. Fox served as field superintendent.

All work was done under the direct supervision of John S. Dean, engineer of waterworks construction, reporting to W. W. DeBerard, city engineer of Chicago. Carl Riggenbach is resident engineer of construction at the filtration plant and John R. Baylis is engineer of water purification.

Hydro Plant Eases Mexican Power Shortage

A hydro-electric power plant recently placed in operation at Ixtapantongo, Mexico, is expected to relieve the acute power shortage in the Mexico City area. The 31,000-kw. plant will be followed by two others at nearby El Durazno and Santa Barbara as part of a two-year program aimed at providing a total generating capacity of 150,000 kw.

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The Seabees in the Normandy Invasion

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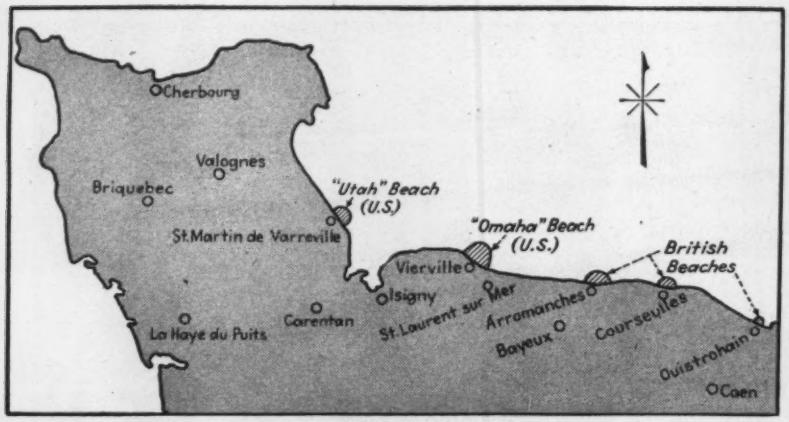


Fig. 2. Two American and three British landing beaches figured in the Normandy landings in the Bay of the Seine. The deepwater artificial harbors with extensive installations were offshore from St. Laurent sur Mer and from Arromanches.

eastern side of the Cherbourg peninsula northwest of Carentan, at the village of St. Martin de Varreville, and the other some twenty miles farther east, where the coastline runs more nearly east and west, at St. Laurent sur Mer. During the planning of the invasion these two locations were given the code designations of "Utah" and "Omaha" respectively, and those designations have been retained as geographic names in subsequent discussions. Beaches to be assaulted by the British forces were to be east of the American locations, at Arromanches, at Courseulles and at Ouistrohain.

Logistically, Omaha was planned to be the major American location, with Utah fulfilling a supporting and supplementing function. At both beaches there were to be harbors of refuge for small landing craft, but at Omaha there was planned, in addition, an artificial harbor of about two square miles, to be provided with moorings for seven Liberty ships, five large coasters, and seven medium coasters. This plan was conceived by the British early in 1943, and the detailed designs subsequently executed were the work of British engineers. It had been adopted at the Quebec conference in August, 1943, as a vital part of the plans made at that time for the invasion of the European continent.

Small-craft refuge harbors

The plan called for the installation by D plus 2 (2 days after invasion day) of those "port" facilities that would provide small craft harbors of refuge at both Utah and Omaha. Those harbors were to be formed by scuttling a number of merchant ships bow to stern, roughly parallel to the shore, in about two fathoms of water, in the lee of which small craft such as barges, LCI's and LCT's, protected from the force of the sea, could discharge the personnel and equipment needed immediately to support the beach assault. In code language, each of the lines of sunken ships was known as a "Gooseberry."

Gooseberry One, to be installed at Utah (Fig. 3), was to consist of ten ships which when sunk end to end would form a breakwater of sorts, about 4,000 ft. long and some 4,500 ft. offshore at high tide. At Omaha, Gooseberry Two (Fig. 4), was to consist of fourteen merchant ships, and an old British battleship, the "Centurion." The length of the Gooseberry at Omaha would be about 6,500 ft. and it would lie 4,000 ft.

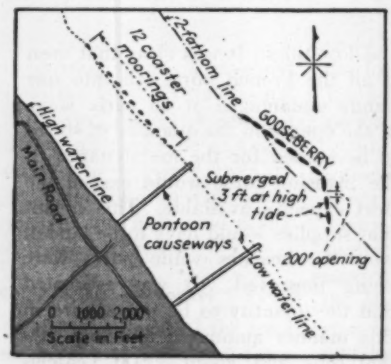


Fig. 3. At "Utah" beach, the landing point nearest Cherbourg, a shallow draft harbor, or "Gooseberry", was formed by a line of sunken ships.

offshore at high tide. In all instan the ships, without cargo, would company the invasion forces, after being sited in their proper cations by tugs would be sunk setting off explosive charges, wh would blow out their bottoms.

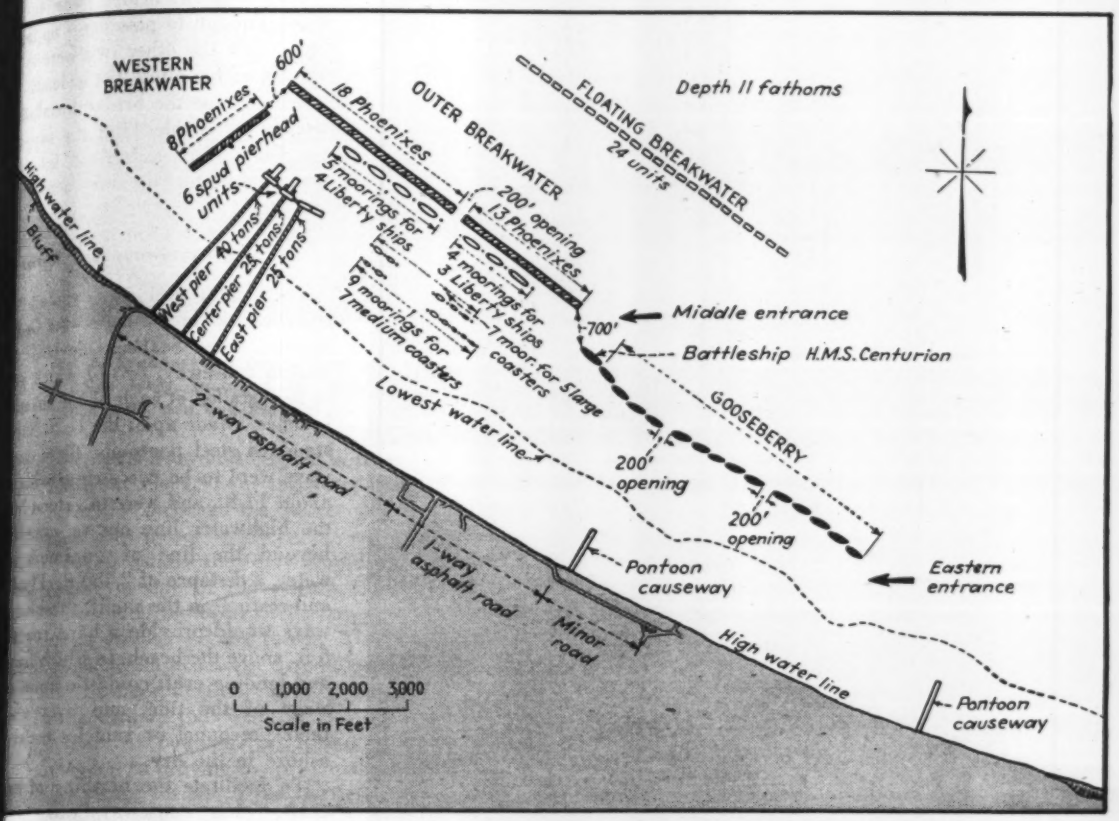
The harbor for large ships

The artificial harbor for Oma coded "Mulberry," was to be stalled just west of the Gooseb (Fig. 4), and the plan called for i be completed and in operation b plus 18. Its design called for a bre water 6,500 ft. long situated 4,500 off-shore, in about five fathoms water, with a western arm 1,600 long returning toward the bea This breakwater was to be compo of a series of open concrete caisso to be called "Phoenixes," wh would be towed across the chan sited in their planned locatio flooded and sunk. Openings throu the breakwater were left, as indica in Fig. 4, to permit vessels to en the harbor.

For the installation at Omaha, Phoenixes were to be built by British in a number of dry doc and in tidal basins excavated es cially for the purpose, mostly in Thames estuary. The cross-secti adopted for the caissons had shape of an inverted T. (Fifteen lin describing technical details dele by censor). In each of the caisso outer walls five sets of 12-in. valv were to serve as seacocks, and ne the bottom of several of the cro walls 12-in. square holes were to left, so that in the sinking operation Phoenix contained ten separate co partments to be flooded.

On each Phoenix the space betwe the end wall and the first cross w was to be decked over with a rei forced concrete slab, and forward, intermediate deck was to be provide in the space thus formed and fitt out as quarters for the riding cre Just aft of the midship point a gu platform was to be constructe mounting a 40-mm. Bofors.

About 3,200 ft. offshore from th Phoenixes of the Mulberry, to affo them some protection from the se was to be placed a floating breal water intended to break the surfac waves. This was to consist of a serie of 24 steel units of cruciform cros section, designed to float with a verti cal arm extending 6 ft. above th



4. Extensive harbor facilities covering about two square miles were installed at "Omaha" beach. Those for deep aft vessels included a floating breakwater, a breakwater of sunken concrete caissons or "Phoenixes" and floating rs and shore bridges, the whole coded "Mulberry." The shallow draft harbor formed by sunken ships was called a oseberry" as at "Utah" beach.

ter. The units were to be individ- ly moored and, when placed in e, they would extend for about 00 ft.

Pierheads and floatings bridges

Plans for the operation of the har- r at Omaha called for lightering e cargoes of Liberty ships and sters. In addition the extremely beach and the great tidal range sented natural conditions that re judged to preclude the normal thod of discharging cargo from Ts, i.e., beaching and discharging mbat vehicles under their own wer over a bow ramp. To solve this oblem an elaborate system of ating pier-heads and bridges was anned.

The pier-heads, to be placed far ough out from shore to provide a aft of three fathoms at low tide, re to be composed of floating steel tforms steadied by spuds at which LST could tie up, lower its ramp, d discharge its cargo of vehicles. Six of these units, known as Loebnitz pier-heads, were to be provided for installation at Omaha in the waters protected by the Mulberry. They were to be placed adjacent to each other and so connected by ramps and bridges that they could function together as an articulated structure in the cargo-unloading operation.

As has been stated above, each pier-head was designed to be partially supported by steel spuds at the corners, which would extend above the platform at high tide. Although they were to rest upon the ocean floor, they were not intended to support the pierhead's entire weight, but rather to carry just enough load to anchor and steady it, with buoyancy supporting the rest. Accordingly, the pier-head proper was suspended from the tops of the spuds by an arrangement of sheaves and cables and, by means of power-driven winches, it could be raised and lowered as the tide flooded and ebbed so that the amount of load carried by the spuds would remain constant. The raising and lowering operation could be controlled by the indications of extensometers attached to the cables.

Access to the shore, 3,200 ft. away at high tide, was to be provided by three multi-span bridges, or piers, roughly 500 ft. apart and totaling over two miles in length. Each bridge would consist of a series of half-through steel trusses supported at the ends by moored concrete or steel floats. The trusses were lozenge shaped, with a maximum depth of 8 ft. and were to be fabricated of common structural shapes, with bolted or riveted connections. The bridge would carry a steel deck roadway of 10-ft. clear width. In addition to these standard units, several special telescopic spans were to be built for the three bridges, each one allowing for a 9-ft. variation in length. Also, shore ramp floats of shallow draft were to be provided to fit the conditions to be encountered at the beach end of the bridges.

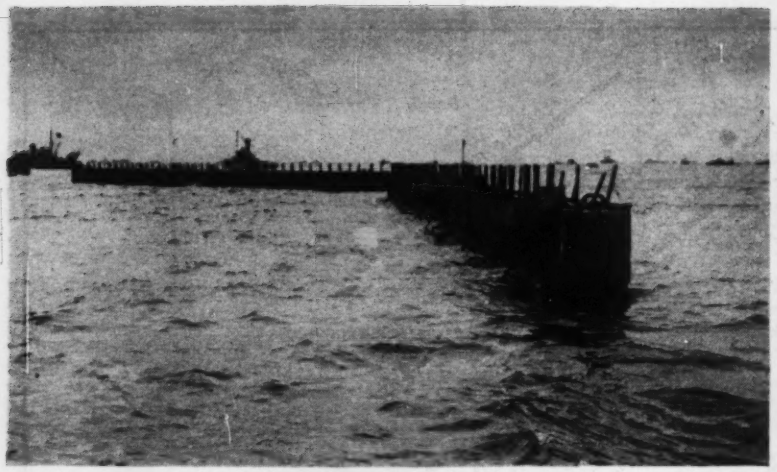


Fig. 5. Three types of breakwaters were used to protect the landing beaches. Top: floating steel breakwater units of cruciform cross section anchored far out to break the force of the waves. Center: maneuvering one of the open concrete caissons (Phoenixes) which were sunk in about 5½ fathoms to form the deep-water harbor or Mulberry. Bottom: Line of ships sunk in 2 fathoms to form the shallow draft harbor or Gooseberry. Concrete Phoenixes and floating steel breakwater units were built and brought to marshalling harbors by the British. From this point they were handled by the Construction Battalions for towing to and installation at the Normandy beachhead site.

The western bridg was to
strong enough to pass loads up to
tons, while the other two were to
capable of handling 2[illegible]-ton loads.
code language the bridge installat
became a "Whale" and the suppo
ing floats were assembled into
span trains for the tow across
Channel.

Pontoon causeways and ferries

To facilitate unloading the craft
come ashore in the lee of the Goo
berries, the Seabees devised
sunken causeway, two of which w
to be installed at each of the invas
beaches. Made up of the U. S. Nav
standard steel pontoons, these cau
ways were to be two strings wide,
about 14 ft., and were to extend fr
the highwater line out to somew
beyond the line of minimum
water, a distance of 2,450 ft. Flood
and resting on the sands, these cau
ways would provide a hard roadw
5 ft. above the beach, to which bar
and landing craft could tie up at
stage of the tide, and over wh
their personnel or vehicles could
ashore in the dry.

To facilitate the berthing of th
craft, each causeway was to
equipped with eight "blisters,"
sunken stages roughly equivalent
pier heads, staggered on alter
sides, four pontoons wide and twe
long, spaced 250 ft. apart. The cau
ways were to be towed across fr
Britain in 176-ft. lengths.

Finally, as another aid in getti
materials ashore in a hurry from
chored ships, the Seabees conceiv
the Rhino ferry, an oversize bar
made from the pontoon gear, s
strings wide and thirty pontoons lo
or about 42x176 ft., having a capac
of 300 tons, i.e., 30 to 40 load
vehicles. At the forward end a 14
wide ramp, 20 ft. long, provides f
the discharge of the ferry's car
(The ramp is known as an "Ols
ramp," after its designer, Lt. C.
Olson, USNR, who was killed
action at Salerno with the 1006th D
tachment.) At the stern of the Rhi
two vertical timber knee braces we
installed, designed to engage the sid
of a lowered LST ramp. Used as
lighter, a Rhino ferry, powered b
outboard motors can carry to sho
in two trips the vehicles that can
brought in by an LST. It was planne
that the Rhino would be made fas
or "married," to an LST, stern t

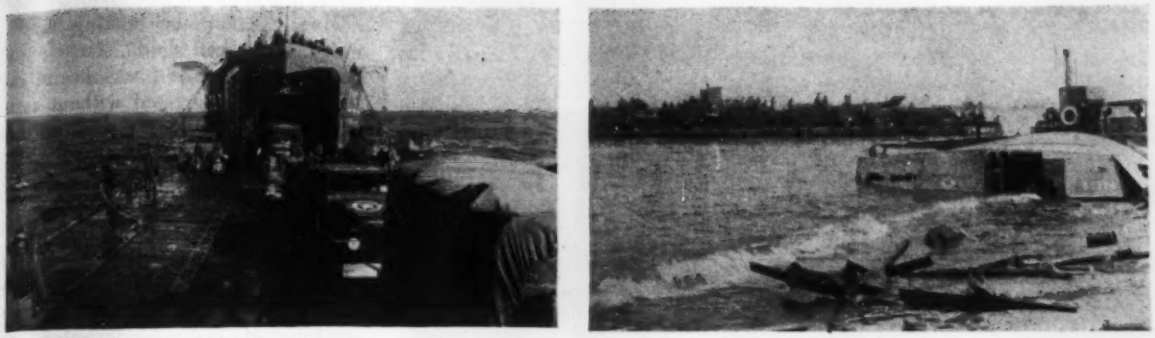


Fig. 6. Seabees and their Rhino ferries of assembled steel pontoon units brought the first supplies to the beaches. Left, a Rhino ferry, fastened or "married" to an LST, takes on a load of vehicles. Right, a ferry approaches a wreck-strewn beach with men and supplies.

bow; vehicles would be able to transfer from the LST to the ferry and leave the ferry at the beach under their own power.

When ashore the ferry would discharge at one of the sunken causeways or, if necessary, discharge its cargo directly on the beach. Thirty-six such Rhinos were assembled by the Seabees at their Britain bases. In addition, the Seabees fashioned out of the pontoons 36 Rhino tugs intended to provide the principal motive power for the Rhino ferries; 12 causeway tugs, to assist LCT's in berthing and unberthing at the causeways; 12 warping tugs, designed primarily to pull broached boats off the beach; 2 Rhino repair barges, almost as large as the Rhino ferries, each fitted with two 5-ton cranes and a tool house; and 2 floating drydocks, of 475-ton capacity, for vessels up to LCT size.

Division of responsibility

The production of the Phoenixes, the Loebnitz pier-heads, the Whale bridge units and the floating breakwaters was a commitment of the British, as was their transportation in tow from the points of manufacture to the marshalling areas from which they were to be dispatched to the Normandy coast.

The production of the Rhino ferries, the sunken causeways, and all other craft to be built of pontoon gear, the manning of those units while in tow across the English Channel, and their installation and operation at the invasion beaches was to be the responsibility of the U. S. Navy Construction Battalions. In addition, the Seabees were assigned the tasks of manning the Phoenixes, pier-heads and Whale bridge trains while in tow across the Channel, their installation at Omaha and their operation and maintenance after construction had been completed.

The provision of transportation facilities ashore, from the beaches to the fighting fronts, was the responsibility of the U. S. Army Corps of Engineers.

Such were the plans and the planned facilities.

The invasion begins

During the last week of May, movement of all equipment to the various marshalling areas began. D day was not far off. On June 5, D minus 1, the Rhino ferries and Rhino tugs, with their Seabee crews aboard, were taken in tow by LST's and left for the far shore. The invasion was under way.

At 0530 the following morning, June 6, D day, H minus 1, the first Rhino-LST teams began to arrive at the Omaha assembly point, 12 miles offshore. Upon arrival they were released from tow and married to their LST's, although waves were 6 ft. high whereas it had been thought that a 3-ft. sea would be the maximum in which the operation could be carried out. The vehicles carried by the LST's then moved onto the ferry decks, and the Rhinos started for the beach between 0700 and 0800.

Upon their arrival at the beach all the Rhinos were ordered to stand out, for beach obstructions had not been cleared. One Rhino, however, had already landed between two beach obstacles when the order was received and was in such a position that it could not be retracted until mines that were astern had been removed. Accordingly, it unloaded on the beach at H plus 6 hr. All of the other Rhinos retracted from the beach.

They were held off until the afternoon of the next day, June 7. The sea was heavy and the current was strong; the Seabee crews had absolutely no protection from wind, weather, or enemy action on an open deck of a barge having a freeboard of only 18 in. When finally ordered to come on to the beach the Rhinos had to labor for hours to get back into their proper areas.

The Rhino tugs suffered greatly. They were knocked out by mines and they collided heavily with submerged abandoned vehicles which began to accumulate as the assault proceeded. Most of the tugs had to be abandoned, and the Rhino ferries thereafter were propelled by their own outboard engines.

At the same time, Rhinos were arriving at Utah, where the sea was at least as heavy as it was at Omaha and where bombing and strafing by German planes added to the severity of operating conditions. Nevertheless, five Rhinos succeeded in marrying their LST's and in making the transfer of the vehicle load. Four unloaded their cargoes on the beach before 2400 on D day, accounting for the landing of 175 vehicles.

In the meantime, while the first ships were being sunk (by regular Navy forces and not Seabees) to form the Gooseberries at Omaha and Utah, the sunken pontoon-causeway equipment began to arrive. At Utah the first causeway was laid on the extreme eastern flank of the beach, and was fully operational on June 9, D plus 3. Shell fire from the same batteries that were harassing the installation of the Utah Gooseberry sought out the causeway group intermittently but caused no casualties. The

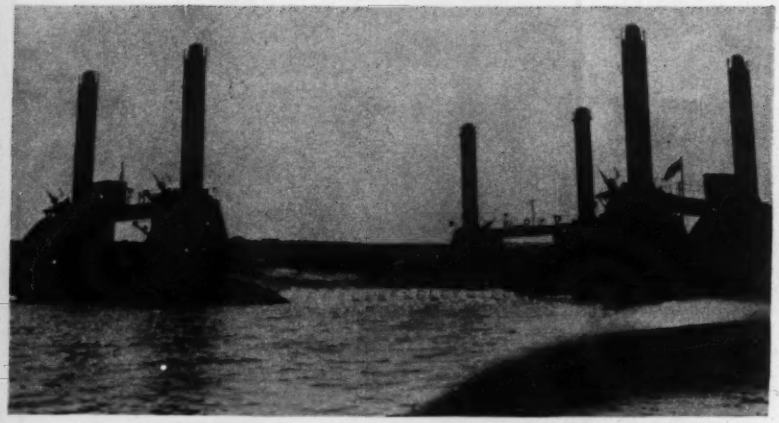


Fig. 7. Huge barges steadied by spuds in deep water and known as Loebnitz pierheads were connected to shore by floating bridges. Over these facilities, aided by a floating ramp identified as No. 433 in both the lower and the upper views, vehicles could move directly from LST's to the beach.

second causeway arrived from England on June 14, and was put into place about a half mile farther west on June 15.

At Omaha, the actual configuration of the beach was such that the feasibility of the causeway designed on the basis of intelligence reports was thrown into question. It was finally decided to make the structure four pontoons wide, instead of two as originally planned, to place the "blisters" opposite each other instead of staggering them, and to make the length 1,450 ft. instead of the 2,450 ft. originally intended. This would permit LCT's and Rhinos to come into the causeway on either side, and by making their approach at a 45-deg. angle, they could come in at any point along its length. Both causeways at Omaha were in full operation by June 16.

Phoenixes for the Mulberry breakwater were scheduled to arrive at Omaha in the early morning of June 8, D plus 2. The first tows of the great concrete structures put in their appearance, however, eight hours ahead of schedule, at 2200 on June 7. The survey for the Mulberry had just begun earlier that day. The Phoenixes were maneuvered into position in the western breakwater arm the next morning, flooded, and sunk. On June 9 the western arm was extended by one more unit, and a beginning was made on the outer breakwater by the installation of its first Phoenix. By that time the survey work for the Mulberry had been completed and it was possible the next day to install five more units. During the days following, Phoenixes arrived in tow, were sited, and were sunk with considerable regularity. By June 15 the western half of the outer breakwater was complete and but two more units were still to be installed in the Mulberry's western arm.

Moorings for the floating breakwater had been laid, starting on June 7. Installation was begun on June 8 and progressed without serious difficulty until its completion on June 13.

The pier-heads and bridges

The survey of the site of the Loebnitz pier-heads and Whale bridges had been attempted on June 7, but had to be deferred because of the presence of many underwater obstacles and mines in the proposed location so that a start on the installation was not made until June 11, when both the western and the center bridges were begun. The survey had indicated that the depth of water close to shore was greater than had been shown on the charts from which the Mulberry operation had been planned. To take advantage of the situation, and to compensate for the loss of one bridge train while in tow across the channel, the length of all bridges was shortened 480 ft.

By June 15 the center pierhead and bridge were complete, and the next morning LST's began unloading over them. Observations of unloading operations at the partly completed installation that day showed that LST's could discharge their vehicles in an average time of 64 min. or at the rate of 1.16 min. per vehicle. By June 18 the western pierhead and bridge, with a capacity of 40 tons, was also ready to be put into service.

The great storm

At that point, disaster struck the beaches. On the morning of June 19 a gale out of the east and north-east caused a stoppage of all construction work. Wind velocities reached 32 knots; the barometer fell from 30.04 in. to 29.92 in. during the day. Early in the day it was necessary to evacuate the U. S. Army anti-aircraft gun crews from several Phoenixes in the outer breakwater, for heavy seas were breaking over them, sweeping away hand rails and shelters at the base of gun platforms. Before the day came to an end the outer breakwater began to show signs of approaching collapse.

The storm showed no signs of abating the next day. The floating breakwaters, torn loose from their moorings, had been driven ashore by the force of the wind and, piling up against the Whale bridges, subjected

those structure to forces beyond their capacity to withstand. High seas were still breaking over the outer breakwater units, and they began to break up.

The fury of the storm continued throughout June 21. Disintegration of the outer breakwater became progressively more extensive, and consequently the seas within the harbor became even higher. On the morning of June 22 the fury of the storm began to abate. Wind velocity fell and the seas decreased in height. Conditions remained entirely too severe to permit the resumption of port operations, however, until June 23.

Omaha presented a tragic scene when the storm was over. The entire beach was strewn with a confused tangle of wrecked small craft of all types. The floating bridges and pierheads had been carried away and damaged beyond repair, as had also the floating breakwaters. The Mulberry's outer breakwater had lost 20 of the 28 Phoenixes which had been in place when the storm broke, although those in the western breakwater arm were still intact. All the Rhinos had had their mooring lines cut by drifting craft and were broached on the beach. Pounding for three days by heavy wreckage had virtually demolished the engines of all 20 of the great barges, and a great many of the Rhinos' pontoons had been smashed.

At Utah there were no Phoenixes, Whales or floating breakwaters to be damaged. The blockship breakwater which had been installed under such hazardous conditions fared as well as its counterpart at Omaha, battered but still serviceable after the storm. The two causeways had had the sand cut away from beneath them by the force of the sea and had settled 2 to 3 ft. into the beach. Wrecked small craft littered the beach to create a scene similar to that at Omaha.

The Mulberry installation at the British beach at Arromanches also suffered from the storm but the damage was not so extensive as at Omaha. For one thing, the orientation of the beach and its port structures relative to the direction of the storm was somewhat different, and considerable protection was afforded by the Calvados Reef, a rocky shoal area just north-east of the harbor installation. For another, the Phoenixes at Arromanches were set in water slightly shallower. Furthermore, at Omaha the construction work was about 85 percent completed when the storm hit, while at Arromanches the work had made far less progress.

Operations are resumed

When the severe weather subsided, the wreckage littering both American beaches had to be cleared away, not only to salvage the maximum amount of usable equipment but also to put the beaches into an operating condition again. Here again the Seabees were pressed into service, and salvaged a number of LTC's, barges, coasters and small craft.

At Omaha a survey of the Mulberry led to the conclusion that it was too far gone to be repaired. As that meant that the Gooseberry would be the beach's only protection against the open sea, the blockship installation had to be strengthened. Accordingly, 10 more ships and 21 more Phoenixes were brought across from England and sunk so as to reinforce the Gooseberry by forming a second breakwater immediately inshore from the installation that had been originally laid down.

At Utah the two causeways that had settled badly had to be taken up and re-laid somewhat farther west. In the rebuilding, their width was increased to four pontoon strings (28 ft.), equal to the causeway width at Omaha, the "blisters" were eliminated, and the length was reduced to 1,400 ft.

The Rhinos were back in service at Utah, lightering vehicles and cargo from ship-to-shore, on June 22, the first day after the storm. Because of the great damage done at Omaha to the barge equipment, particularly to the outboard engines, Rhino operations there were not fully resumed until July 1.

Marrying Rhinos to LST's was dis-

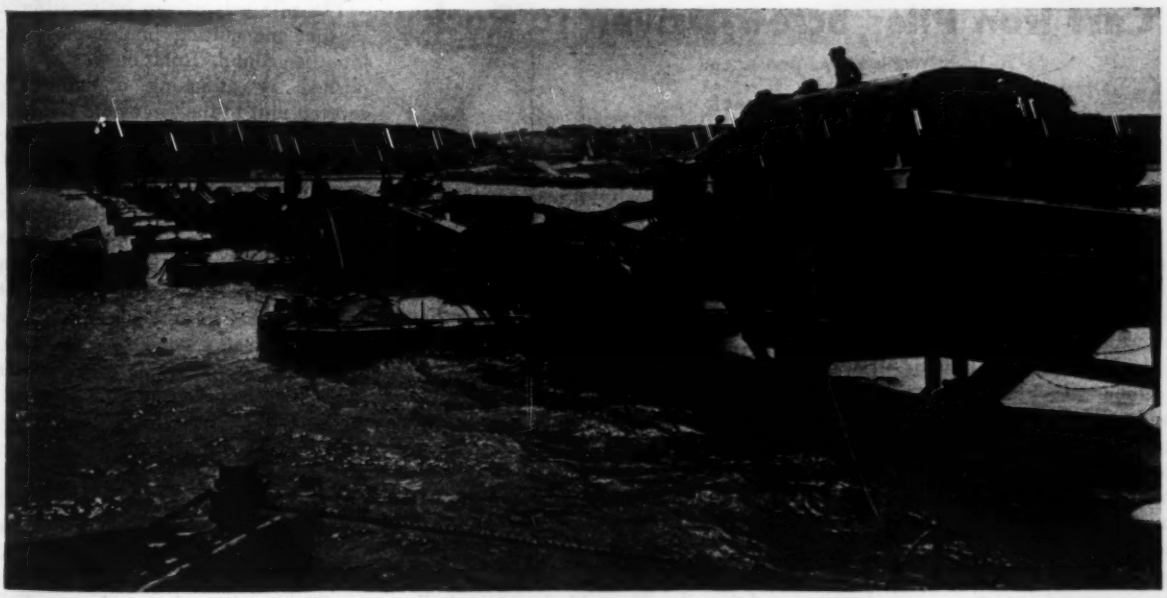


Fig. 8. Lozenge-shaped half-through trusses spanning 80 ft. between barges formed the floating bridges connecting the pierheads to the shore. A 10-ft. roadway was provided.

Fig. 9. Before it could be finished and prove its worth, the deep draft port at Omaha beach was wrecked by an unprecedented storm. Note landing ramp No. 433, which floated in from the spud pierheads in the background.

continued on D plus 7, for it had been found that the landing ships could be successfully beached. During the first ten days of the invasion, Rhinos had accounted for the landing of 5,286 vehicles at Utah and 16,000 at Omaha. The Rhinos were thereafter used to lighter vehicles and cargo from Liberty ships and coasters, the transfer being made by the ships' cargo booms. The causeways continued to carry out the function for which they were intended, the unloading of vehicles from LCT's and personnel from LCI's.

Personnel

The U. S. Navy's part in the events described above was the responsibility of a Task Force under Rear Admiral Alan G. Kirk, which included the Amphibious Forces under Rear Admirals J. L. Hall, Jr., and Don P. Moon. Responsible for the operation of the landing craft to be used in the assault and for their supporting bases was the Commander of Landing Craft and Bases, Rear Admiral John Wilkes, under whom, by virtue of his command, came the Seabee activities in the United Kingdom associated with the varied phases of the European invasion.

Participating closely in the planning and execution of the naval phase of the invasion was Rear Admiral J. J. Manning, CEC, USN, Director of the Atlantic Division of the Bureau of Yards and Docks, and special adviser to the Commander of Naval Forces in Europe, Admiral Harold R. Stark, USN.

Capt. C. W. Coryell, CEC, USN, assisted by Comdr. V. W. Buhr, CEC, USNR, was in charge of the 25th Naval Construction Regiment during the invasion period. The officers in charge of the Construction Battalions of the 25th Regiment that participated in the events described in the foregoing article were as follows:

81st C. B.—Comdr. W. P. Greenawalt, CEC, USNR.; 108th. C. B.—Comdr. E. T. Collier, CEC, USNR.; 111th C. B.—Comdr. D. J. Jardine, CEC, USNR.; 146th. C.B.—Comdr. E. H. Gessner, CEC. USNR.; 1006th. C. B. Detachment—Lt. W. C. Pietz, CEC, USNR.

Cast Iron Piles Screw-Driven to Rock

Richard Tench
Structural Engineer and Inspector
Robert W. Hunt Co., San Francisco, Calif.

CAST IRON POSSESSES the desirable property of being practically immune to oxidation and corrosion from salt water and is completely safe from attack by marine borers, characteristics that are essential for structural members, such as piles, used in piers and other waterfront structures. But cast iron is brittle, and continuous blows from a heavy driving hammer may crack the metal. Thus, in the usual sense of the word, it is not practical to drive cast iron for use as piling and other means has to be found to secure penetration and bearing power.

Some years ago the writer installed, for the British Admiralty, a pier that was supported on circular, hollow cast iron piles, screw-driven into the river bed by a process not believed to have been reported in American engineering magazines.

Soundings were made to determine the approximate depth of piling required and then sections cast to a convenient length for handling, with flanges at the ends for connecting additional units. At the bottom of the lower section of each pile two cutting blades were cast as an integral part of the pile. These blades were similar to a propeller both in appearance and action.

The pile was driven by rotating it so that the cutting blades pulled it into the ground. Rotation was accomplished by attaching a temporary capstan unit to the top of the pile and turning the capstan with a manila line attached to a winch drum. The capstan frame, with a hexagon center, applied its torque to the pile through a driving section on which it could slide up to maintain a fair lead from the hoist as the pile moved down. It was supported from the top of the pile by two chains.

The hexagon driving section was fabricated by riveting and was attached to the pile through a matching flange. The center of the capstan frame was solid with four wood arms inserted, each with a "jaw" at the end capable of taking four or five turns of 2-in. dia. manila rope. The end of the pulling rope was fastened to one of the arms and wound around all of them, then to the drum of the winch.

uring the driving operation the wise pull of the winch line was re- d by temporary falsework of ed wood piling. Heavy wale es at the permanent pile location dapped to accommodate half the meter of the pile and a movable strap put around the pile to hold ertical during the driving opera- As the winch was operated at speeds, the pull exerted on the around the capstan arm, rotated pile and gradually screwed it into river bed. As this continued it was essary to remove the hexagon stan or top section, add another th of piling, replace the capstan ion and then proceed with the wing operations.

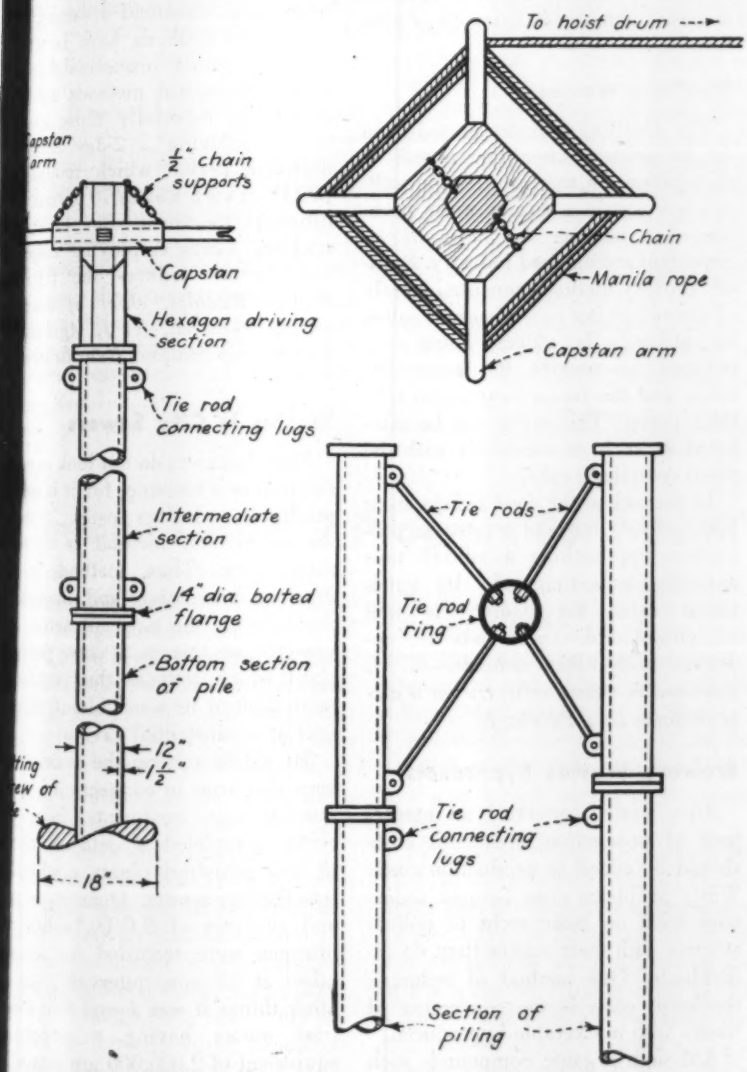
The last or top section of the pile was cast to the special length required to bring it up to what normally is the "cut-off" level. The length of the top sections were determined as soon as possible and cast promptly to permit completion of the entire structure.

Diagonal tie-rods

Tie-rod bracing lugs were cast on each section of piling, but as it was not certain just which way the lugs would face after the piles were driven through the overburden to rock or to refusal, lugs were placed at quarter points around the piles, top and bottom. The tie-rod bracing for any pair of piles was in four sections, one end of each being attached to the lug of the pile and the other end to a steel ring about the diagonal center between the pair of piles. Use of the tie rod rings made it possible to have the tie rods of varying lengths and at different angles, thus making it unnecessary that adjacent pile sections be of the same length or driven to the same elevation.

Bracing below the water was attached by a diver and the substructure inspected by the engineer from a diving bell. A coat of hot tar or bitumastic was applied to the piling, down to the water level, after the falsework was entirely removed.

While the installation described is perhaps high in first cost, a permanent structure is obtained that should last indefinitely with little or no maintenance.



st iron pile, driven by turning so the integrally cast blade draws it into the soil. manila line around the capstan arm and to a hoist provides the power cessary for turning the pile into the ground.

Paris Green Larvicide For Airplane Dusting

In airplane dusting operations for the control of *Anopheles quadrimaculatus* larvae an average of approximately 75 percent of the paris green dust drifts away from the treatment area due to its fine particle size. Studies undertaken by the Tennessee Valley Authority and described in *Public Health Reports* (Nov. 10, 1944 issue, p. 1458) show that the efficiency of the operation could be improved by increasing the particle size of the dust.

R. L. Metcalf and A. D. Hess of the health and safety department of TVA reported that a special paris green was purchased which had a particle size analysis of 84 percent by weight from 20 to 50 microns in diameter. This was compared by airplane dusting with standard paris green which had 48 percent by weight in this size range.

The use of the coarse dust resulted in a 60 percent increase in the amount of dust reaching the treatment area. Field tests with the coarse dust under average conditions gave a larval kill of 90 to 100 percent. Manufacturing costs for the large dust were no greater than for the standard product.

The authors believe that specifications for paris green to be used in airplane dusting should be revised to encourage the production of a material with a more desirable particle size composition.

Notes on Industrial Waste Utilization

***Editor's Note**—What are now termed "waste" products by some industries may in the future provide a source for the derivation of valuable by-products. This was the theme of a conference sponsored by the sanitary engineering department of Purdue University in which 15 industrial, waterworks and sewage disposal organizations participated. Abstracts of some of the papers are presented in the following report compiled for Engineering News-Record by Harry W. Gehm, technical director of the National Council For Stream Improvement.*

Petroleum Waste Utilization

Industrial wastes might be defined as those materials which are produced in manufacturing processes and are uneconomical to recover. This applies particularly to the refining of petroleum where the types of wastes produced change as processing methods and products change. For example, gases that once were burned are now utilized for making aviation gasoline.

However, the most satisfactory solution of some waste problems may not be found in utilization—even when recovery processes are existant—for the cost of recovery may exceed the cost of disposal. For example, brines discharged from oil wells in many cases are disposed of by injecting them into underground chasms, the cost averaging $55 per million gallons. Recovery of sodium chloride from brines has been practiced, but this is more costly than obtaining the material from mine operations. Likewise, magnesium, iodine and bromine can be produced from brines but their extraction is more costly than by other processes now in operation.

While brine recovery processes are not economically feasible, profits from wastes are best realized by other uses within the petroleum industry. The recovery of oil from waters and the subterranean storage of collected gas for future use are examples of this application. Much has been done to prevent oil losses in refineries, which lose from 0.5 to 3.0 percent of the materials processed. The use of drip collectors on pumps, water level draw-offs, controls on tanks, and oil separators have reduced losses appreciably. Recovery of acid, burning-oil and coke from sludges have been important advances in internal utilization.—*R. F. Weston, sanitary engineer, Atlantic Refining Co., Philadelphia, Pa.*

Distillery Wastes

The distilling industry passed from art to science after the repeal of prohibition. In this progression stillage, previously a serious waste problem, has become the basis of an important animal feed industry. Earliest recovery methods consisted merely of screening, but now dissolved solids are utilized, the stillage being centrifuged to remove the suspended solids and the liquor evaporated to a thick syrup. This syrup can be marketed as such or combined with the dried centrifuge cake.

In peacetime the feed brings from $20 to $30 a ton and a postwar production approaching a million tons annually is anticipated. Its nutritional value for poultry is well recognized and experiments are underway with other animals.—*R. A. Rasmussen, nutritionist, Hiram Walker & Sons, Inc., Peoria, Ill.*

Brewery Wastes Byproducts

Since waste treatment is an integral part of production, treatment costs should be added to production costs. Waste problems arise because industries have no more right to pollute streams with their wastes than do individuals. One method of reducing treatment costs is the conversion of wastes into marketable byproducts.

Although organic compounds such as vitamins and other chemicals are produced from brewery waste, only a small portion of the waste is now capable of utilization. Glycerol, ash and certain phosphate compo are being produced as war mea but the economy of their produ under normal conditions is que able. Profits from by products pay a portion of the cost of treatment yet the economical ba is often not considered care enough.

In the future brewery waste centrates will be utilized, but waters will require treatment. trodialysis, chemical treatment absorption methods have been but were either unsuccessful or costly. Biological methods are promising, especially those inst tions employing a 2-day anaer digestion period which reduces B.O.D. of such wastes 70 percent. ditional treatment on high trickling filters employing recir tion further reduces the B.O. *Willem Rudolfs, chief of wate sewage research, N. J. Agricul Experiment Station, New Brunsw N. J.*

Wastes in City Sewers

Manufacturers do not look on w disposal as a blessing, for it is sel profitable and often costly. To th the least costly method is the m satisfactory. Thus, methods inv ing loss prevention and byprodu recovery are the most attractive. example of this is a corn produ plant which reduces the populati equivalent of its waste almost 90 p cent at a substantial saving.

To aid in solving the many pr lems that arise in connection with dustrial waste treatment, Chicago cently completed a detailed surv of 303 industrial plants dischargi into the city sewers. Quantity of fl and analyses of B.O.D., solids a nitrogen were recorded for samp taken at 15 min. intervals. Amo other things it was found that indu trial wastes having a populati equivalent of 2,800,000 are treated Chicago's sewage plants and th segregation of condenser water is a visable, as dilution of concentrat

stes makes them more expensive treat.

The ease of recovery of some ma-ials may be shown by recovery of ease, hide, scraps and hair in the king industry and of phenol and s in others. The use of wastes to oduce burnable gas is also a pos-ility.—*F. W. Mohlman, chief emist, Chicago Sanitary District, icago, Ill.*

lk Industry Wastes

Three types of waste problems are countered in the milk products in-stry, namely:

(1) Waste resulting from product ses within the plant. This can be ntrolled by education of employees d improved equipment.

(2) Utilization of byproducts. od progress has already been made this field, but there is still much to done.

(3) Disposal by various processes ilar to those employed in sewage atment. This method is expensive d should be resorted to only after sent possibilities regarding the her two angles are exhausted.

Prevention of product loss and illage is the least expensive method en to the milk industries to abate eam pollution. Much technical ogress has been made along this e. Rapid complete-draining milk ns, pre-rinse devices employing very small quantities of water (allowing use of draining for byproducts), better pumps properly installed, vat level controls and other devices are available which can cut such losses to a remarkable degree.

Vacuum pan carryover has been a source of serious losses. Entrainment devices and other systems to prevent these losses will reduce waste to a great degree and soon pay their installation cost. It is sound reasoning to spend money for equipment which will return investment rather than for disposal equipment which is a total liability.—*H. A. Trebler, chemical engineer, Sealtest, Inc., Baltimore, Md.*

Food Canning Wastes

While disposal of canning wastes is both difficult and expensive, wash-waters present the most difficulty because of their high dilution. Also, their tendency to rapid decomposition makes their use in irrigation impractical. Utilization of more concentrated canning wastes is not promising because of the seasonal nature of the industry, perishability of the wastes and reluctance of the canning industry to enter a competitive field. In addition, returns would be small at best.

A million tons of canning waste is produced annually. Numerous byproducts are being or have been produced, but none show promise of becoming profitable ventures absorbing a major quantity of any one waste as geographical distribution of the wastes makes a number of promising product developments impractical for application.—*N. H. Sanborn, secretary, National Canners Assoc., Washington, D. C.*

Metallurgical Industry Problems

Through the use of wastes within the industries producing them, conflicting interests have become reconciled. Thus, with saving as an incentive, pollution prevention is effected. For example, the brass and copper industries of Connecticut lose more than 12,000 tons annually of zinc and copper in pickling processes, dilute solutions of wasted wash waters accounting for 85 percent of the metals and acid lost.

Several processes have been developed whereby it is claimed that recovery of materials formerly lost will pay for cost of treatment after installation of required equipment is made. Pickling liquors and plating wastes are being treated by electrolytic and other experimental methods. Also, the use of inhibitors in pickling baths serves in some cases to reduce losses, as less solution of metal occurs and baths can be used longer.—*W. S. Wise, chief engineer, Connecticut State Water Commission, Hartford, Conn.*

Sewage Disposal Program For Miami

Three plans for construction of ade-uate sewage disposal for the city of iami have been submitted by Sam-el A. Greeley, of Greeley & Hansen, hicago engineers. Costs range from 7,572,000 to $8,795,000. Payment ould be made by self-liquidating onds, according to the report made A. B. Curry, city manager, and S. Nichols, city engineer.

At present the sewage of Miami is ischarged into the Miami River and iscayne Bay through 62 outlets. The esulting pollution is objectionable nd a potentional threat to the public ealth, although only about 63 per-ent of the present winter population ave sewerage service.

Project "A" calls for an activated ludge plant at a site south of the 36th t. airport with sludge disposal near NW 82nd Ave. Cost of this plan is estimated at $7,572,000. There would be a treatment plant located west of the central part of the city, with the effluent discharged into the Tamiami Canal, the Comfort Canal and, or, the south fork of the Miami River. Under this plan a high degree of treatment is required.

Project "B" comprises a short period aeration plant located in the north part of Virginia Key, provided an area of about 20 acres is available. The sewage can be brought from the Miami waterfront to this site either by a force main from the pumping station located at the bayfront or by a gravity sewer across the bay to a pumping station located at the treatment plant. Digested sludge would be barged out to sea. The estimated cost of this proposal is $8,481,000.

Project "C" comprises an ocean outfall sewer extending 37,150 ft. east from the bayfront. It includes preliminary treatment by screening and grease removal.

Greeley said that project "A" has the lowest construction cost. Project "B" is higher in construction by about $910,000, and project "C", the ocean outfall, by about $1,220,000—both as compared to project "A". He added, "the gross annual operating cost of project "A", however, is higher than the operating cost of the other two projects. Assuming a gross revenue from the sale of dried sludge of $55,000 per year, the net operating cost of project "A" is still higher than that of project "C" and a little lower than that of project "B".

At present there are about 221 miles of sewers, from 4 in. to 30 in. in size, serving Miami.

Timber Bridge Design Shows War's Effect

THE BRIDGE across the Albion River in Mendocino County on the route from San Francisco to Fort Bragg, constructed at a cost of $350,000, is one of the numerous structures built by the California Division of Highways according to design governed chiefly by wartime limitations. It has become the custom to mark the drawings for these bridges: "This type of structure used in order to reduce to a minimum the amount of critical materials required."

It is hoped that later criticism of the structures will be forestalled by this explanation of designs that otherwise would not have been used. In this particular case it was feared that the hybrid structure would be "of unsatisfactory appearance." However, when completed the general appearance was much better than expected.

The old bridge, which was replaced, was built by the county in 1922 and taken over by the state in 1933. Due to the light design the bridge was posted for 11 tons at a maximum of 15 m.p.h. After almost continuous repairs the bridge finally reached a point where it could not be kept in usable condition and could not safely carry the large loads hauled from the lumber mills to the north. Because of the importance of trucking out the lumber, approval was given by the WPB for a new bridge at this point to be built during the war.

Designs prepared for a steel structure and another set developed for a concrete arch had to be rejected because of the critical situation on structural and reinforcing steel. A timber structure was then designed but before the contract could be let, timber had also become a relatively critical material.

The job finally got under way with a design in which the span across the main channel was an old steel truss 130 ft. long salvaged from an abandoned logging railroad bridge. This span is supported on two concrete towers in which steel rail was used for reinforcing. Columns or legs at the four corners of these towers are 28 in. square and each leg has a 45-lb. T-rail in each corner. The four rails are tied together with hoops made of ½-in. reinforcing bars. The tall timber towers supporting the approach structure on both sides of the main span were made of salt-treated fir which was cut to length, bored, dapped and shaped before treatment.

The treated members were shipped to the job and were there fabricated much as steel would have been. The prefabricated material was assembled into convenient sections on a flat near the bridge. The bents were the erected in three sections. Lowe bents were set up by a crane workin in the bed of the stream. The r mainder of the bents, A-frame assem blies, bracing, etc., were erected b job-made stiff-leg derricks tha worked at deck level moving ou from the bank. The derricks bega at the north end and proceeded to th north concrete tower. Constructio operations then were transferred t the south end and the bents were bui successively until the crew reache the south concrete tower.

The steel trusses were assemble and riveted up, separately, on a work ing platform between the two piers Each truss was raised as a unit b joint operation of a stiff-leg derric on the south concrete tower and crane on the north tower. The lif was about 115 ft.

There are concrete footings unde the timber bents; the deck consist of timber stringers with a plank floo and asphalt surfacing. All detail were worked out according to Cali fornia state highway standards fo S-15-9 bridges—the nearest AASH rating is H-15.

Design was prepared under super vision of F. W. Panhorst, bridge en gineer, Division of Highways, Cali fornia Department of Public Works

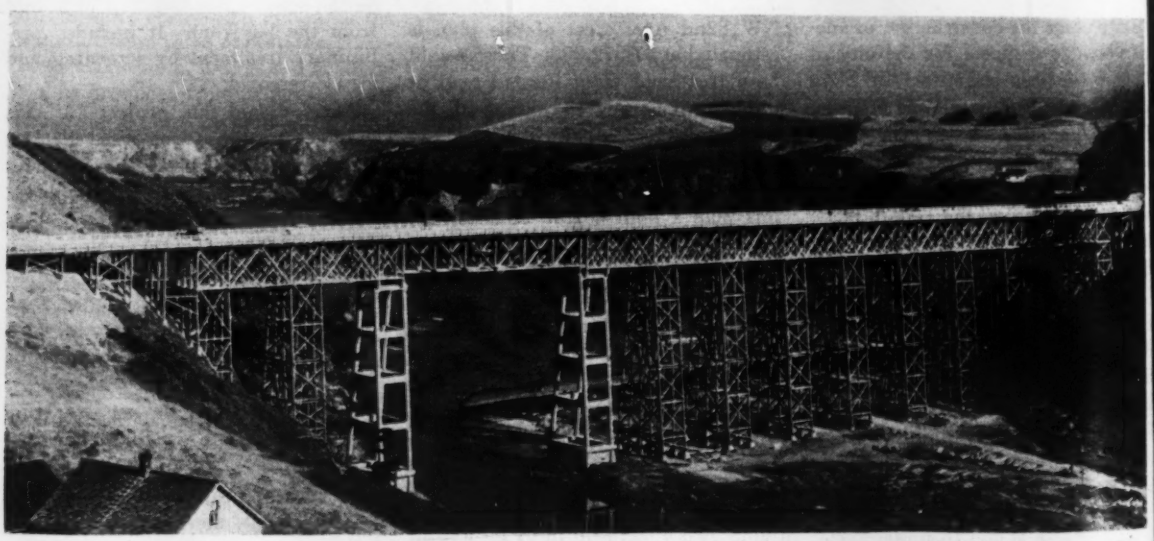


Fig. 1. Highway bridge across Albion River in northern California, designed to avoid use of critical materials.

Fig. 1. Skyscrapers jammed together on small plots have caused excessive congestion in New York City.

New York City Amends Zoning Law

***Contents in Brief**—For the first time in 28 years, major changes in zoning regulations in New York City were effected when the Board of Estimate, on Dec. 1, 1944, approved the recommendations of the Planning Commission. Additional restrictions on the height, bulk and area of new buildings were imposed for the avowed purpose of improving realty values and preventing blighted areas by increasing the amount of open space, light and air about future construction. The Planning Commission, attempting to raise zoning standards immediately, made this initial, admittedly imperfect step at this time to take advantage of the present lull in building.*

FAMED FOR ITS SKYLINE of distinctive beauty, New York City has found that its skyscrapers and tall apartment houses, huddled together on small plots, have created intricate problems, affecting the health and welfare of its citizens. Experience has shown that there are definite limits beyond which the accumulation of sheer bulk and height ceases to be profitable either to the community or to the owner.

Consequently, further restrictions on the height, bulk and area of future construction were recommended by the New York City Planning Commission on Nov. 1, 1944. Exactly one month later, the Board of Estimate voted to adopt these limitations and amended the existing zoning resolution accordingly. In approving the changes, members of the board stated that although the amendments were imperfect, it would be a tragic failure not to take advantage of the present lull in building and not to provide as an interim measure the protection they afford. So, while the new law does not reflect an ultimate aim, the board thought that it was the most effective step that could be taken at this time. The Planning Commission is expected to continue for at least two years its studies for a complete revision of the city zoning rules.

In its report to the Board of Estimate explaining the need for more restrictions, the Planning Commission pointed out that although it may be possible to house most of New York's activities in a few groups of gigantic buildings, it cannot be done without destroying the value of other buildings and other land. Senseless overbuilding freezes in steel and concrete conditions which militate against the city as a place in which to live and do business. The resulting excessive congestion of traffic, transportation, parking and loading is uneconomical in the long run. Overbuilding in New York has already had serious consequences, the commission stated.

Zoning unchanged since 1916

This report also called attention to the fact that the old zoning resolution, which was adopted in 1916, for many years has been subject to widespread criticism because it permitted what has been characterized by many authorities as excessive building bulk and height. It has remained substantially unchanged for the past 28 years, during which period the population of New York has increased from 5,300,000 to almost 8,000,000 and most of the city's skyscrapers and other large buildings have been erected. The congestion and overbuilding problems that led to the first zoning law in New York have been greatly aggravated, but no alleviating laws have been passed. Because of the expected revival of building in the postwar period when materials and labor will again be available, the Planning

Commission claimed that the timeliness of taking another forward step in raising zoning standards was obvious.

The commission believed that while the general welfare is the primary objective of zoning, increases in the open space, light and air around buildings enhance property values, produce higher rentals, stabilize residential neighborhoods and business districts, and protect private property from detrimental factors which hasten obsolescence and blight. Also, restrictions on the height and bulk of buildings tend to halt the trend toward decentralization that threatens values based on the manifest advantages of concentration of peoples and activities in a community such as New York City. The real cause of congestion and all its bad effects, the commission felt, was to be found in the relation between individual buildings and the size of the lot they occupy. A building of moderate height and bulk may contribute relatively more to local pedestrian and vehicle congestion than a skyscraper on an adequate lot.

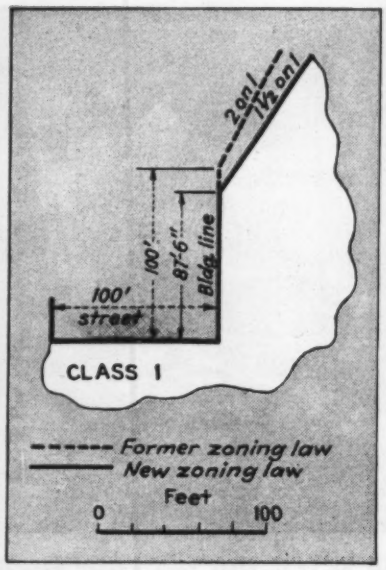


Fig. 2. Restrictions on height imposed by the new and old zoning law in New York City are compared for a building in a Class 1 District fronting on a 100-ft. wide street.

The remedy prescribed by the commission was the requirement that every structure be provided with enough space about it to assure sufficient light and air for its own occupants. Automatically, such a provision will improve the light and air conditions of adjacent properties. Of great importance is the reduction of the permitted land coverage of the great majority of buildings. While height and bulk are more limited under the new zoning resolutions, nevertheless, both tall and large structures may be erected. However, the amendments providing this solution do not go as far as the commission would like and hence are characterized by the commission as interim zoning.

Building heights reduced

The old zoning regulations divided the city into eight classes of height districts, in each of which the height of a structure is related to the width of the street. In effect, the new law shifts existing height districts into the next more restrictive ones. For example, according to the old law, in a "One-Times District" no building could be erected to a height in excess of one times the width of the street,

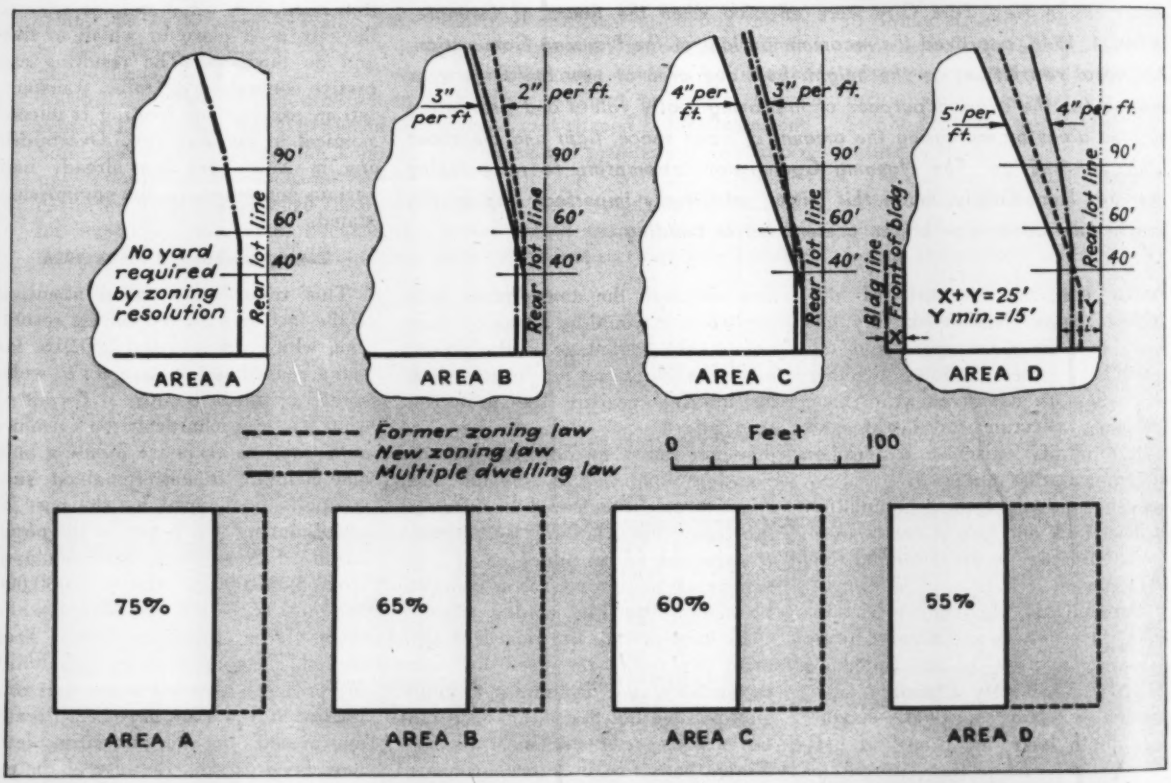


Fig. 3. The amendments contain stringent rear yard requirements and coverage limitations. In the upper diagram, rear yard requirements are compared for the various area districts; in the lower, the maximum area to be occupied at curb level is specified. The law does not specify location of building on plot.

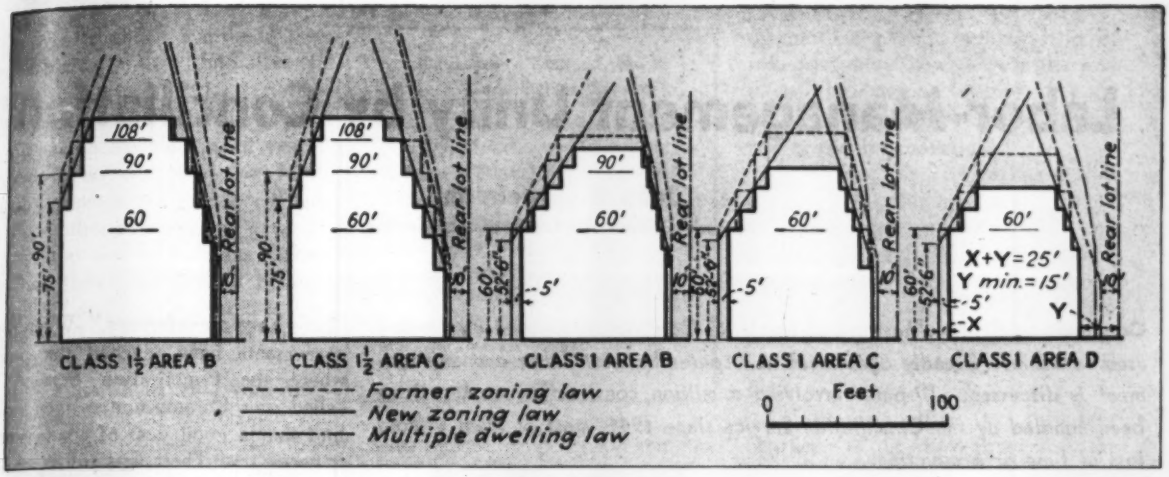


Fig. 4. The effect of the amendments on maximum envelopes are compared for multiple dwellings on a 60-ft. street in a residence district. Note effect of setting structure back from building line.

but for each foot that the building or a portion of it set back from the street line two feet could be added. Thus, on a 100-ft. street in a One-Times District a building could be built at the property line to a height of 100 ft., after which setbacks began.

The amendments reduce permitted heights and increase setbacks in most districts. A One-Times District becomes a Class 1 District, in which the permitted height at the property line is seven-eighths of the width of the street, and for each foot that the building sets back from the street line 1½ ft., instead of 2 ft., may be added to the height limit. In effect, a One-Times District becomes a Seven-Eighth Times District, but is designated as a Class 1 District. Fig. 2 illustrates the effect of the new law on Class 1 districts.

At the intersection of a wide and narrow street, the permissible height is derived from the application of the appropriate multiple to the wider street, but this factor does not apply to portions of the structure more than 100 ft. from the boundary of the wider street.

Area coverage limited

For the purpose of regulating and determining the area of a plot that may be occupied by a building, the city is divided into ten area districts. However, only four of these areas—A, B, C and D, which include main business sections—are affected by the new law. Fig. 3 shows the effect of the amendments on coverage as compared to the former zoning regulations and to the multiple-dwelling law.

For each of the area districts, where these coincide with use districts devoted to residences and to various types of retail trade, explicit percentage limitations as to coverage are provided. In the case of corner lots a somewhat higher coverage is permitted than for interior lots, a distinction previously recognized in the old zoning resolution in certain instances; but the amount so benefiting has been reduced generally to 5,000 sq. ft., in order not to unduly penalize the interior lots.

Whereas the old law permitted 100 percent coverage at curb level in A, B, C and D areas and by rear yard requirements limited coverage above the first floor in B, C and D areas to 90 percent or less of the area of interior lots, the amendments increase the dimensions of required and optional courts and rear yards. Experience, the Planning Commission claimed, has clearly shown the need for the greater light and air thus provided.

It should be noted that the new law does not specify the position of the occupied area on the plot. Except for rear yard requirements, the occupied area may be located as desired.

Another change consists of the elimination of the right to start rear yards 23 ft. above the curb level in all the various retail and residence districts. Also, permission is given to exceed the coverage limitation in all the retail districts, as far as the first story is concerned, when equivalent space is provided within the building for parking and loading facilities. This space may be located in the basement, on any of the floors within the structure, or on the roof. Ramps and similar adjuncts are considered part of the parking and unloading area.

Complete revision sought

Most of the objectors to the amendments that now have been approved recommended a complete revision of the old zoning resolution, drastically changing the present use districts, eliminating both height and area districts and substituting a new type of bulk district. The Planning Commission, claiming that bulk zoning required highly technical formulas and that arguments were bound to arise over its adoption and application, overruled the objections on the ground that there was not sufficient time to make radical changes in the zoning regulations. However, further bulk zoning studies are in prospect; but the commission did not want research to interfere with immediate, interim improvements in standards to prevent further overbuilding, such as would otherwise inevitably accompany postwar boom construction.

Five members of the Planning Commission—Chairman Edwin A. Salmon, architect, John C. Riedel, chief engineer of the Board of Estimate, Robert Moses, park commissioner, Lawrence M. Orton, planning consultant, and Cleveland Rodgers, former editor of the *Brooklyn Eagle*—recommended the amendments, but the sixth member, Public Works Commissioner, Irving V. A. Huie, who advocated a scheme for bulk zoning, voted against them. William J. Shea is the commission's chief of staff.

Labor-Management Unity by Conciliation

John R. Steelman
Formerly Director, U. S. Conciliation Service

Contents in Brief—The work of the U. S. Conciliation Service and means used to achieve friendly agreement in disputes between labor and management is discussed. Disputes involving a million construction workers have been handled by the Conciliation Service since 1941, most of them without loss of time or production.

WE ARE APT TO THINK that differences over wages and hours provoke most industrial disputes, and certainly these issues are present in a majority of cases. But the thirty-year record of the U. S. Conciliation Service shows quite clearly that other, and often neglected, factors play an equally important part.

The construction industry affords a rather interesting example of this. In the year ending June 30, 1942, which was marked by a very high level of construction activity, the Conciliation Service disposted of 481 disputes involving 431,143 building trades workers. During the next twelve months the Service handled 643 disputes with 453,014 construction workers involved. The latter year saw a sharp decline in the volume of construction. Even more important, wage rates in this industry were largely stabilized as of July 1, 1942, under the Building Construction Stabilization Agreement sponsored by the Government.

Wages stabilized

A survey of union wage rates by the U. S. Bureau of Labor Statistics covering more than 600,000 union members in 75 cities showed that average hourly wage rates on July 1, 1943, were up 0.7 percent from 1942. Of course, such averages do mask some wider changes, but wage-rate increases were reported for only 10.7 percent of the union members for whom comparable 1942 data were available. This is borne out, too, by the BLS index of union hourly wage rates for all building trades:

1941	113.1
1942	120.2
1943	121.0

Without laboring this point, what are the other factors which complicate and often touch off controversies along the industrial front? The answer to this question makes a very good approach to the work of the U. S. Conciliation Service. It embraces a wide range of subjects which can be lumped under one general heading—human relations.

These subjects include familiar items like collective bargaining itself, and they also include less tangible subjects like the personal attitudes of foremen, workers, and supervisors—the hidden animosities, the grudges and grievances that are bound to occur when men are grouped together.

The experience gained in handling nearly 100,000 cases, disputes occuring in every branch of industry and under almost every imaginable circumstance, has served to highlight this human angle. Faulty understanding and personal bias can magnify even the smallest difference into what looks like an unbreakable deadlock between employers and employees.

In settling these various controversies which range from strikes and lockouts to sundry disputes, the Conciliation Service relies entirely on voluntary methods. This very fact has helped to shape the procedure that Commissioners of Conciliation follow. Since they do not issue orders or decrees, these men must depend on frank discussion and mutual understanding to bring about agreement between employers and employees. The conference table has proved to be by far the best medium for promoting such settlements.

But conciliation is not just a matter of saying to management and labor, "Let's have a conference." When disagreements have reached the point where the Conciliation Service is called in, Commissioners generally find that a good deal of spade work is necessary. Their first job is to get a rounded picture of the whole dispute—the formal issues and the undercurrents that make for discord. When a Commissioner is assigned to a case, he begins by interviewing the two parties separately. The next step is to bring them together in a joint conference. As a rule these preliminary talks will give the Conciliator a good insight into the real nature of the dispute. Quite often he is told what each side is willing to concede in order to reach a settlement. While these conversations remain off-the-record, they are invaluable to the Commissioner who must chart the course of future negotiations.

An actual case

The best way to describe this process is to look at an actual case history, but without using real names, since all files are confidential. A telegram from Washington directing him to contact G. J. McBain, general manager of a New England construction company, was Commissioner Kellar's introduction to a case. Arriving on the scene, he went first to the general manager's office and found Mr. McBain in conference with his electrical superintendent. They were discussing the threatened walkout of inside wiremen on a war housing job and asked Kellar to come right in.

The complaint was that two men back from the Pacific had been rehired by the company at their old classification of electrician's helpers and the union wanted them classified as journeymen for an inside wiring job. According to the superintendent they could not do the work—carrying a walkie-talkie and running a few wires for the Signal Corps had not, in his opinion, made them competent inside wiremen.

"The real trouble," continued the superintendent, "is that I had already hired another veteran who'd never worked for the company before. He was a topnotch mechanic with years of experience so naturally I gave him the best journeyman's rate, $1.70 an hour. The other two men are getting $1.10, the top rate for helpers. That's more than they were getting before they enlisted and they appeared to be satisfied until the union told them about the other veteran."

During a half-hour ride with the superintendent out to the project to talk to the men themselves and the business agent of the union, Conciliator Kellar picked up several interesting sidelights. For one thing, the two ex-service men "had always been hard to handle". They had been hired again only because they were discharged veterans—both had slight physical disabilities, not severe enough to interfere with their work.

The business agent disagreed with McBain (the contractor's general manager) and the superintendent about the veterans' capabilities. "You learn fast in the army," he insisted, "and those guys know enough about wiring now. Sure they were hard to handle before. One of them took a poke at the super and he's never gotten over it. That's the real trouble. And this other veteran—he's not so hot. He just happens to be the superintendent's brother-in-law."

Learning that the job would run about three months but that the company had two other jobs that would last for a considerable time, the Conciliator inquired if the workmen would be willing to finish the job as helpers if they were promised a journeyman's card on the next job. The business agent thought the workmen might go along with the idea but doubted that the contractor's manager would. He agreed, however, to keep the suggestion confidential.

McBain, the manager, was dubious about the proposal at first. He didn't like the idea of "going over the superintendent's head." It might create hard feelings, he felt, even if the men could do the work.

"You have a good bit of hard feeling right now," Conciliator Kellar said, "but this will give your superintendent an out. Make him think it's his idea. Let him propose it at a joint conference and put the idea in writing."

Regional offices of the U. S. Conciliation Service

H. Ross Colwell, Parcel Post Building, 341—9th Avenue, New York 1, N. Y.

Clarence H. Williams, 10 Forsyth Street Building, Atlanta, Georgia

Edward J. Cunningham, 258 Federal Building, Cleveland 14, Ohio

William White, 222 West Adams Street, Room 375, Chicago 6, Illinois

E. P. Marsh, Phelan Building, Room 533, 760 Market Street, San Francisco 2, California

That simple proposal became the basis of an agreement satisfactory to all concerned. However, the point to remember is not the actual solution but the methods used to arrive at the solution. Once the Commissioner had ferreted out the human problems, the economic issue presented no real difficulty.

Discussion is road to conciliation

Time and time again Commissioners have much the same experience all along the industrial front. Frank, open discussion is the cornerstone of conciliation, but when tempers are short and personal antagonisms cloud the issue, real negotiation is almost impossible. In spite of the progress made in this field during recent years, the hard fact remains that all too often both sides carry chips on their shoulders. There is still a great need for labor and management, through education, to understand fully the value of conference table methods.

And the very fact that there are real differences between management and labor makes this need even more imperative. These groups do not have identical aims and purposes despite the large community of interest which exists. Even during the war a common patriotic impulse has not prevented controversies. Indeed, the stress and strain of all-out war has created new tensions. We can be sure that military victory will usher in a whole array of peacetime problems for those who work and those who direct work.

Whether or not the construction industry reaches new peaks in this postwar period, labor disputes are inevitable. Looking ahead, the Conciliation Service will have no magic wand to wave. Commissioners will offer no sure-fire formula for industrial peace. What they can do is bring to each dispute the patient, willing help of men who know how to pave the way to real negotiation. In nine cases out of ten they are able to do this without any break in production.

At present the Service has a staff of some 300 Commissioners spread over the country in key industrial and business centers. Their activities are directed from five regional offices, each with its own director. An administrative staff in Washington coordinates this work at the national level.

In keeping with the voluntary character of its whole procedure, the Conciliation Service only enters a dispute when asked to do so by representatives of management, labor or the public. Occasionally the Service may volunteer its aid when it is believed to be in the public interest. Needless to say, the origin of the request has no influence on the way a case is handled. At one time a large majority of calls came from labor. Now they are about equally divided between employees and employers.

Arbitration plays an increasing important part in labor relations, and the Conciliation Service has a staff of Commissioners with special training in this field. These men are equipped to hear cases and render awards. This, too, is entirely voluntary, and such cases are accepted only when both sides request arbitration and agree beforehand to abide by the arbitrator's award. During this war period the wage issue in such awards are subject to review and approval of the National War Labor Board.

When all of the issues of a dispute involving the war effort are not settled by the Conciliation Service, the case is considered for certification to the War Labor Board. During the last fiscal year 4,572 cases were certified to the Board, among them 47 involving construction workers.

Tomorrow's problems are going to call for more extended use of job evaluation, foremen training, grievance machinery, employee educational plans, on-the-job training and job classification. None of these methods is new but their increased use can greatly aid in promoting the kind of understanding we shall need in the days ahead. Whether we call it the "climate" of conciliation, enlightened self-interest or something else these methods are well-marked sign posts on the road to industrial peace.

Denver Water Board Plans Five-Year Improvement Program Paid by Revenues

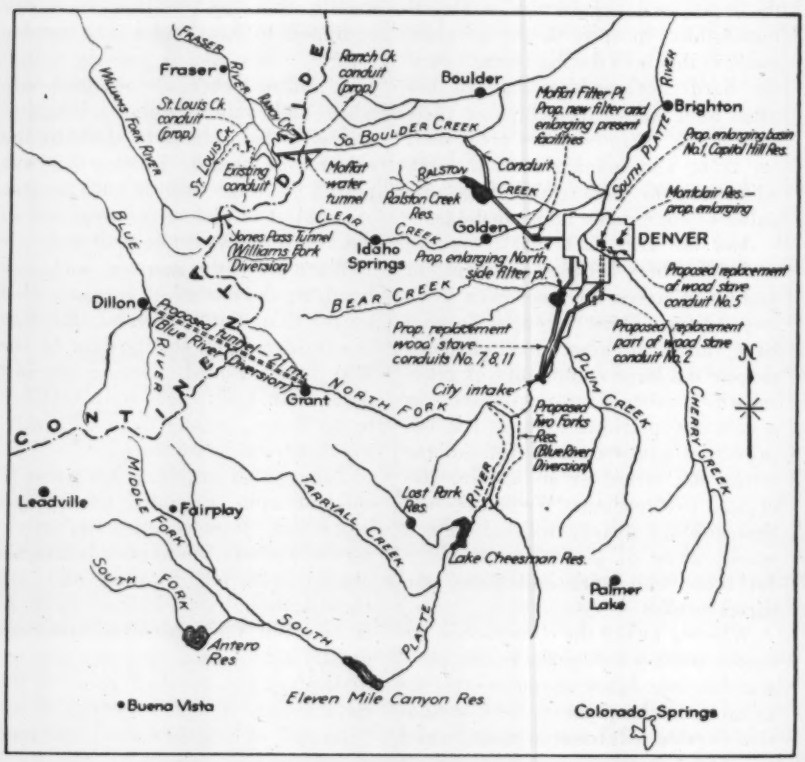
***Contents in Brief**—In the development of a five-year program to increase its water supply, the City of Denver has turned to transmountain diversion from streams west of the Continental Divide, which offers the best source for exploitation. Plans include conduit, filter and reservoir improvements. As now set up, the program involves an average yearly expenditure of $1,165,000, and projects totaling an additional $1,600,000 have been planned.*

THE Board of Water Commissioners, city and county of Denver, Colo., is all set for resumption of civilian construction with a five-year program to cost about a million dollars annually. Financial plans contemplate the whole program will be paid for out of current revenues and surplus accumulated from projects deferred during the war.

Start of this improvement work must, of course, await the end of the war and availability of materials, but it is hoped conditions will permit making 1945 the first of five years of continuous construction activity under the plan. While the program as now set up will average $1,165,000 yearly, additional projects totaling another $1,600,000 have been planned, which can be thrown into the five-year schedule or held for the period immediately following. Some features of this added work may, if conditions warrant, be substituted for projects in the original schedule. Also, looking way ahead, the Commissioners have indicated a long-range program that will continue for years to come, keeping well ahead of expected demands.

Denver's chief source of water supply is the mountainous watershed of the South Platte River and tributaries south and west of the city. Prior water rights for irrigation projects in the main river valley northeast of Denver limit the amount of water the city can take from this watershed. As the city has exploited the South Platte source almost to the limit of its rights, Denver has turned to transmountain diversion from streams west of the Continental Divide for additional supply.

First of the diversion projects was the conversion of the pioneer bore of the Moffat R.R. Tunnel to a water tunnel to conduct water from Fraser River and its tributaries to the headwaters of South Boulder Creek on the east side of the Divide. A small dam 25 miles down the creek from the tunnel diverts the water into a conduit leading to the new Ralston Creek Reservoir. The next transmountain project was driving of the Jones Pass Tunnel for diversion of waters from the headwaters of Williams Fork River into Clear Creek. Water thus obtained does not enter the city's distribution system, but is exchanged for water otherwise held by irrigation rights.



Postwar expansion of Denver's water supply will include conduit, filter and reservoir improvements and further development of transmountain diversion.

More transmountain diversion

Plans for future development of additional water sources center around more diversion from the Western Slope. In the immediate five-year program new canals and conduits in the Fraser River (Moffat Tunnel) watershed will account for $1,276,000 out of the $5,000,000 schedule, with work totaling $774,000 listed as a carryover and still more extensions are included in the long-range plan. The main future development on the West Slope, however, will be the Blue River diversion project which may be started within five

ars, but whose construction will ntinue for a long time. Chief con- ruction feature of this project will driving of a 21-mi. diversion tun- from Dillon eastward to Grant on North Fork of the South Platte. the Blue River diversion will be a int enterprise on the part of Denver d the U. S. Bureau of Reclamation, furnish irrigation water as well as ditional municipal supply, there ill be some federal funds involved. his scheme also includes a big stor- e reservoir at Two Forks, on the outh Platte.

The remainder of the program is rgely improvement and replacement facilities in the distribution system. cluded are enlargement of two servoirs in the city, replacement of veral wood stave conduits, and en- rgement of two filter plants outside e city.

The accompanying table lists the ems by years in the tentative five- ear program, the alternative projects at might be included, and the long- nge proposed work. Locations of isting and proposed features are hown in the accompanying map.

The Board of Water Commis- ioners, which serve both the city and ounty of Denver (identical areas) includes the following commissioners: Karl G. Brauns, A. P. Gumlick, Geo. R. Morrison, H. S. Sands and Richard Wensley. Geo. F. Hughes is executive secretary and D. D. Gross is chief engineer.

PROPOSED INPROVEMENTS TO DENVER WATER SUPPLY

For Year 1945

Blue River Development, etc.	$100,000
Arrow Tunnel and Ranch Creek Conduit.	101,000
Replace Wood Stave Conduit No. 2	447,000
Enlarge Basin No. 1, Capitol Hill Reservoir	369,000
Enlarge Coagulation Basin and start Filtered Water Reservoir, North Side Filter	220,000
City Pipe System	250,000
Miscellaneous small construction jobs..	100,000
Total	$1,587,000

For Year 1946

Blue River Development, etc.	$100,000
Complete Filtered Water Reservoirs, North Side Filter	157,000
5 M.G. Filtered Water Reservoir, Moffat Filter	116,000
Replace Wood Stave Conduit No. 5	250,000
City Pipe System	350,000
Ranch Creek Canal	380,000
Miscellaneous small construction jobs..	100,000
Total	$1,453,000

For Year 1947

Blue River Development, etc.	$100,000
Ranch Creek Canal	120,000
Enlarge North Side Filter	255,000
City Pipe System	385,000
Miscellaneous small construction jobs..	76,000
Total	$936,000

For Year 1948

Blue River Development, etc.	$100,000
Ranch Creek Canal	200,000
Conduits	181,000
City Pipe System	300,000
Miscellaneous small construction jobs..	84,000
Total	$865,000

For Year 1949

Blue River Development, etc.	$100,000
St. Louis Creek Conduit (Moffat Tunnel Division)	576,000
City Pipe System	243,000
Miscellaneous small construction jobs..	71,000
Total	$990,000
Total for Five Years	$5,831,000

Additional Improvements

St. Louis Creek Conduit	$774,000
Addition to North Side Filters	411,000
Enlarge Montclair Reservoir	135,000
Addition to Moffat Filter Plant	207,000
Conduits	69,000
	$1,596,000
Total for immediate postwar program..	$7,427,000

Additional Improvements Under Long-Range Planning

Blue River Diversion, including Two Forks Reservoir
New Conduit, City Intake to Marston Lake
New and rebuilt basins, Capitol Hill Reservoir.

Rejuvenating a Timber Bridge

Prolonging the life of a timber bridge on California's Feather River Highway in the wartime emergency, reinforced concrete bearing blocks have been installed to carry the thrust between the timber chord and web members of the original trusses, it was reported recently by the State Division of Highways.

Concrete bearing blocks were used to replace original timber ones crushed by the pressure of still sound web members. The results proved satisfactory. Because of the necessity of installing new blocks to fit large steel hanger rods which passed through the center of the blocks, and difficulty in obtaining labor and materials, reinforced concrete was used for repairs.

With none of the truss members dismantled and with traffic rolling over the bridge without interruption, the deck, together with the upper and lower chords was first supported on temporary timber bents at each panel point. When web members were blocked into place, the timber bearing block was split up and removed. Hydraulic jacks were used to lift the trusses back to their proper position.

As described by Jason Plowe, associate bridge engineer for the division, reinforcing bar assemblies were next put in place and forms built around the truss members at each panel point. Tie rods passing through the blocks were wrapped with two layers of asphalt paper. To give full contact against the truss members, Portland cement concrete was tamped into place in the forms.

After proper curing, the forms and temporary bents were removed and the truss tie rods tightened to make the trusses again self supporting.

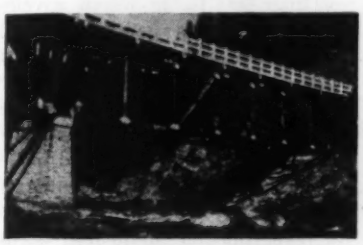


Fig. 1. New concrete bearing blocks on truss members are shown on Feather River Highway, Calif., bridge. Two timber deck truss spans of 114 ft. each with timber trestle approaches carry a 24 ft. roadway.

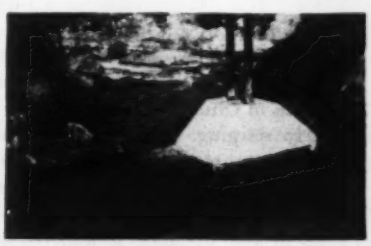


Fig. 2. Reinforced concrete bearing block, 2 ft. 6 in. long, by 1 ft. 6 in. wide and 1 ft. 3 in. high, is shown with 2 steel hanger rods through the center. Original timber blocks were crushed by pressure of web members.

Fig. 1. This equipment is used in Ohio to paint traffic stripes at a rate of 15 mph. and at a cost of $2.30 per mi

Rapid and Economical Traffic Striping

Harry E. Neal
Chief Engineer, Division of Traffic and Safety
Ohio Department of Highways

***Contents in Brief**—Ohio puts 125,000 gal. of traffic guide stripes on 10,500 mi. of road each year at an application cost of $2.30 per mile. Striping is done with shop-assembled trucks that apply one to three stripes at a time at a speed of 15 mph. Paint is air-agitated, atomized and blown on the pavement. Machines now in use are contrasted with walk-type machines where single line stripe production averaged less than three miles per day and cost of application was $12.50 per mile.*

A CHANGE from a 5-gal tank on a pushcart to a 700-gal. tank on a 3-ton truck, and a speed increase from 1 to 15 mi. per hr.—is, in brief, the story of the development of pavement stripping in Ohio.

Early striping was done by small machines, some self-powered, but guided and serviced by an operator on foot, thus limiting the speed and range to the distance a man could walk in a day. Average daily production, painting one stripe, was less than three miles.

In 1939 Ohio adopted the American Association of State Highway Officials standard for marking no-passing zones, with sight distance less than 600 ft., in which a yellow "barrier" line is parallel with the center line and on the side from which crossing is prohibited. With the walk-type machines, this required a separate operation for application of the center line and for each yellow line. It was obvious that this not only was too costly but also was too slow. An experimental motorized striper was built and placed in operation in June 1940. The machine was shop-assembled from standard parts and mounted on a 1½-ton chassis. Operation that year (*ENR*, Feb. 27, 1941, vol. p. 345) showed a cost, exclusive of paint, of $4.77 per mile of high way and $3.47 per mile of stripe.

Experience with this machine indi cated that a number of changes wer desirable and the original unit wa dismantled and rebuilt on a heavie truck. In addition, three new unit were constructed, similar to the re built one.

The later units are a 3-ton, cab over-engine chassis with a wheelbas of 99 in. These units have three compartment tanks of 48 in. dia. and 102 in. long with a total capacity of 700 gal.—300 gal. for white paint, 175 gal. for black and 225 gal. for yellow. Each compartment has a 20 in. dia. manhole to facilitate clean ing the tank when necessary. The manhole covers are equipped with a ¼-in. air cock, a 100-lb. safety valve, and a 2-in. plugged opening for in serting a measuring stick. Each com partment has an air-motor driven, vertical-shaft two blade paint agi tator.

The tank is mounted with its long axis horizontal and longitudinal with the truck. In the original truck striper, it was found that with the tank transversely on the truck the more rapid consumption of paint from the white paint compartment than from the yellow, resulted in a laterally unbalanced load.

On each striper a 60 cfm. V-8 type air compressor is mounted behind the tank with its long axis across the truck. An insulating wall between the compressor and the end of the tank, built of laminated corrugated asbestos, or air cell board, 1½ in. thick encased in a 36x36-in. sheet steel shell keeps the heat from the compressor from overheating the paint in the end compartment of the tank.

Loaded by pumps

The paint tanks are loaded by two rotary paint pumps—one pump for white and yellow, and one for black. Power for driving the pumps is supplied by a power take-off from the motor of the truck through two roller-chains so that each pump can be driven independently. The pumps are mounted on the right side of the chassis back of the cab. Later it was found that if the paint is pumped in the color sequence of white, yellow, and black with the pump and lines cleaned after the pumping of each color, only one pump need be used. Three 2-in. gate valves route the flow of paint into the desired compartment.

A 10 gal. pressure tank to supply paint solvent for cleaning the internal atomizing spray guns is mounted just forward of the rear wheel-well. Compressed air atomizes the solvent through an atomizing head on the solvent tank and forces it through the spray guns.

All operating controls for the paint spray equipment are mounted at the rear of the truck so as to be immediately in front of the spray operator. The air-regulator manifold is a special type having the regulators integral with the manifold. Three regulators and three pressure gauges for tank pressure, and three regulators and three pressure gauges for spray gun atomization pressure are used.

Four-way valves in each of the six air-regulator exhaust manifold ports are used to route the air to spray guns and tank compartments. Three positions of the valves to the paint tanks are used—off, air to tank, and tank pressure relief. Similarly the positions for the atomizing air and paint solvent to the paint guns are—off, air to guns, and paint solvent to guns. As only three positions of each valve are required, the fourth position is plugged.

On the rear panel of the truck, in addition to the above regulators and gauges, are the controls instruments for regulating the air to the paint agitators, and the compressor instruments.

Experience with the first truck-mounted striper, built in 1940, indicated that it is desirable to provide means for lateral movement of the spray guns to enable the operator to compensate for deviations by the

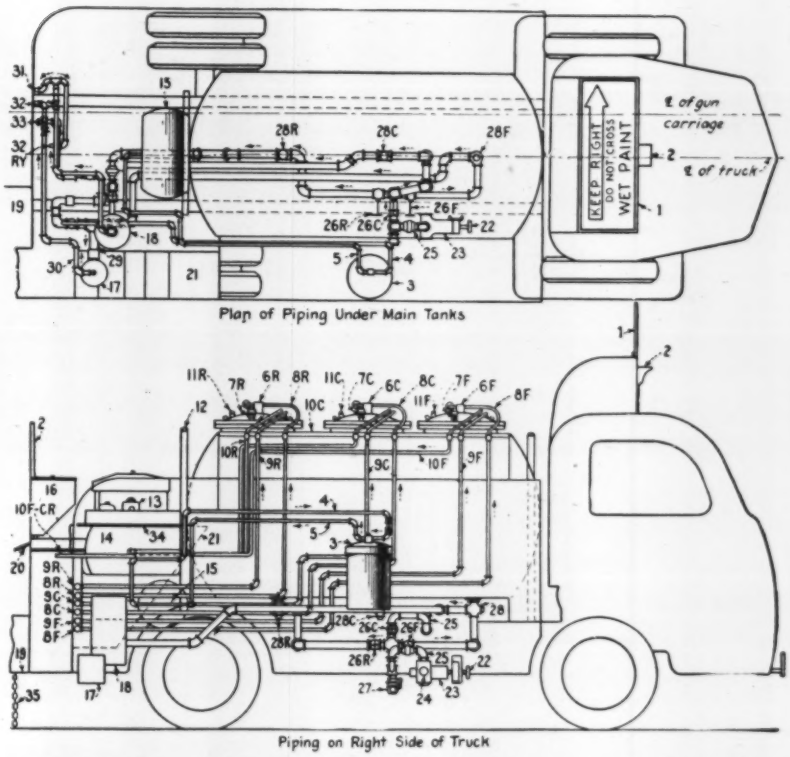


Fig. 2. Layout and piping diagram of special built pavement striping machine.

1 Hinged "Keep Right" sign
2 Oscillating flashing light
3 Spray head cleaner solvent tank
4 Air supply to spray head cleaner tank
5 Atomized spray head cleaner line to spray guns
6 Paint agitator gear box assembly
7 Safety valve
8 Air supply to paint agitator air motor
9 Regulated air supply to paint tank
10 Paint tank pressure indicator—Tank to gage on control panel
11 Tank measuring stick opening
12 Heat wall
13 Air compressor
14 Main air receiver
15 Auxiliary air receiver
16 Glass bead supply hopper
17 Paint filter (front and center tanks)
18 Paint filter (rear tanks)
19 Z-guard storage platform
20 Platform supporting cable
21 Stairway to top of tank
22 Paint pump drive sprocket (from truck transmission power take-off unit)
23 Paint pump
24 Paint intake
25 Paint discharge (paint pump to tanks)
26 Paint supply valve (pump to front tank compartment)
27 Paint tank compartment, drain and paint line wash-out discharge
28 Paint tank intake (from paint pump) and paint tank outlet (to paint filters)
29 Paint filter intake (from front tank compartment)
30 Paint filter discharge (to supply guns)
31 Right and left, yellow spray gun hose fitting
32 White spray gun hose fitting
33 Capped spray gun hose fitting (from by-pass line around white filter. Used only when operating front and center tanks with black paint)
34 Glass bead hopper loading platform
35 Static chain

NOTES:
F—front tank, C—center, R—rear
Arrows along piping indicate direction of flow of air and paint
Air regulator control manifold piping detail not shown
Spray gun carriage not shown

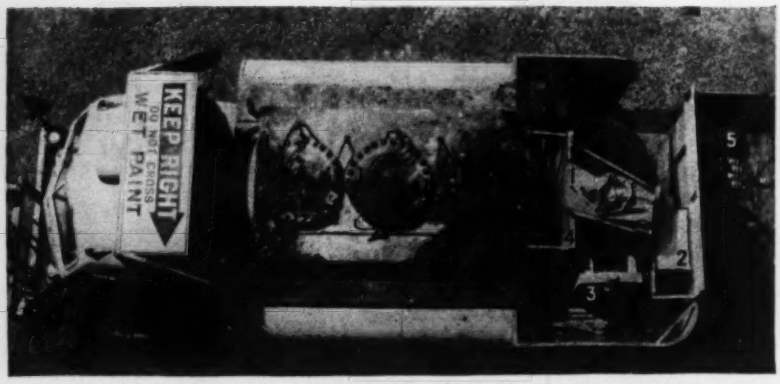


Fig. 3. At the rear of the striping machine is located the following equipment: (1) glass bead chute, (2) glass bead hopper (loaded), (3) air compressor, (4) heat wall between paint tank and compressor, (5) "Z"-guards for wet stripe.

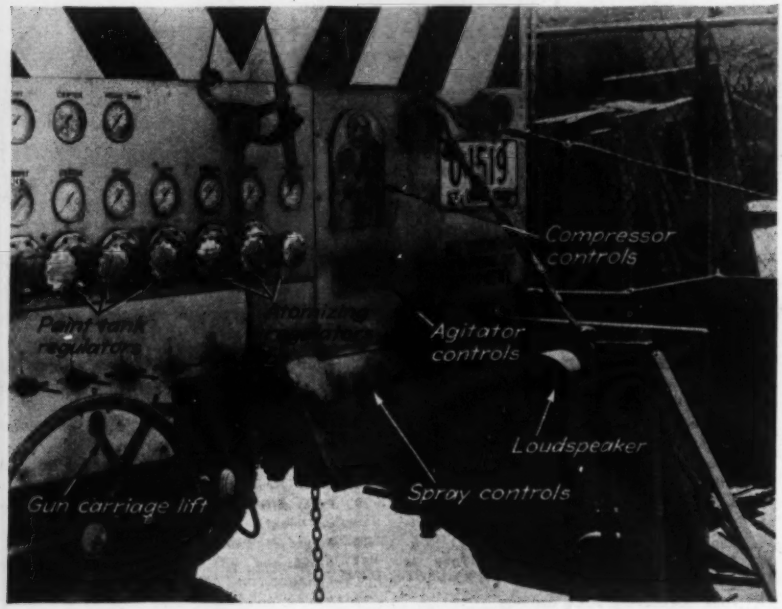


Fig. 4. Rear of truck showing location of paint flow control instruments, driver to spray gun operator telephone and loud speakers.

driver from the correct path, particularly on curves. To provide the desired lateral flexibility, the spray guns are mounted on a dolly riding on two 16-in. pneumatic-tired wheels. The dolly is attached to a standard trailer-hitch ball bolted to a plate that slides in guides attached to the differential housing of the truck. This arrangement permits the spray gun trailer to be moved a maximum of 4 in. to the right or left of normal position. Control of this movement is by means of a conventional automobile steering wheel and column, Pitman-arm and drag-link. The drag-link is attached to one end of a fulcrum that is slotted on the other end and fitted over a ½-in. vertical rod on a plate that moves laterally in the guides.

An air lift is provided to raise the dolly when the truck is in transit or to lower it to the road surface for operation. Safety chains are provided for supporting the dolly in a raised position when the striper is in transit.

A platform suspended from the rear of the truck carries "Z"-guards that are placed on the freshly painted line to protect it while wet. Supported from this platform are two motorcycle saddles—one for the spray operator and one for the man who places the Z-guards on the line. Each saddle is about 8 in. above the pavement. The exhaust from the truck motor and the compressor is discharged through vertical stacks so that the gases do not annoy the operators working at the rear of the truck.

Three large internal-atomizing spray guns of standard make, mounted side by side on the spray gun carriage, are used to apply the stripes. Three levers for operating the paint gun control valves are located to the right of the operator's position. The width of the line applied by each gun is controlled by two floating steel plates or shields, which move vertically on fixed guides.

Paint "skins" conquered

In the original model, considerable difficulty and delay was caused by clogging of the guns by "skins" from the paint. A cartridge type filter with mesh screen in the bottoms of the tank compartments and cartridge filters in the paint lines was tried but was not successful.

In the present truck stripers filters with a capacity of 5 gal. are used. These are installed in a vertical position in each paint supply line ahead of the spray guns. In these filters a screen of 6 in. dia. and 18 in. long with holes of ⅛ in. dia. is brazed to the inside of the removable cap on the lower end. This cap has a ¾-in. gate valve for draining the filter. The top of the screen has a solid cap with an opening just large enough to admit a ¾-in. pipe that extends to within an inch of the bottom of the filter and is connected at the top to the paint line to the spray gun.

Paint is delivered to the filter through a 2-in. line on the side near the top, forced through the screen into the standpipe and out the top into the line to the spray gun. These filters have proved very successful and have eliminated all difficulties due to paint skins. It has not been necessary to clean the filters oftener than once a week.

A sheet steel panel body encloses the tanks and compressor, giving the truck a completed appearance. Storage compartments for tools and paint pumping hose are provided.

Tracer wheel for guide

For guiding the driver on a traffic line to be retraced, or on a prespotted new line, a modified A-frame assembly is used, made of 1-in. boiler tubing electrically welded. This guide has a total length of about 10 ft. including the airplane tail-wheel fork assembly on the front. The wheel on the front, with a 3.00 x 10-tire, is used as the tracer wheel. This unit, mounted well

Fig. 5. Pavement striping outfit on the move. House trailer provides sleeping accommodations for the crew.

ahead on the cab-over-engine truck, can be readily seen and followed by the driver.

The guide assembly frame is made in two parts so that the assembly can be taken apart and folded up against a supporting structure on the front of the truck when in transit. The rear section of the frame is attached to the bumper of the truck by a shaft, in journal fittings.

The steering guide and the spray gun carriage are located so that when in operation the striper straddles the center line or lines being painted. This permits overtaking vehicles to pass on the right, eliminating the need for crossing the wet line to pass on the left. A large sign on top of the body and another sign on the rear platform instruct overtaking vehicles to pass on the right. For warning to approaching traffic, an oscillating blinker light is mounted on top of the cab. The striper also is equipped with a siren for use when necessary.

When the truck is moving, communication between the driver and spray-gun operator is provided by a telephone system using breast-plate transmitters and double head sets. Jacks are provided in the cab and on the control panel at the rear for plugging in the phones.

Ohio uses a center line 4 in. in width and 4-in. yellow no-passing lines. The no-passing line is separated from the center line by a space of 3 in. Black is used only for center lines on concrete roads that have not been oil stained.

About 10,500 miles of center lines, lane lines and yellow no-passing zone lines are applied each year. This requires some 83,000 gal. of white, 7,500 gal. of black, and 35,000 gal. of yellow paint—a total of 125,500 gal. The paint is applied at the rate of about 12 gal. per mile for white and yellow and 10 gal. per mile for black.

In 1943, the average cost of line application by these machines was $2.30 per mile. This included wages, repairs, gasoline and similar expense. It did not include the cost of the paint. With the hand-pushed machines formerly used, cost of application averaged about $12.50 per mile.

Film Characteristics Similar in High-Rate and Standard Filters

Successful development of the high-rate (biochemical) sewage filter has been pointed out by H. Heukelekian, associate in water and sewage research, New Jersey Agricultural Experiment Station, as an example of the general growth of sewage treatment processes where empirical practice has preceded fundamental knowledge and research.

In a paper presented at a recent meeting of the Federation of Sewage Works Associations, Mr. Heukelekian said that evidence obtained from a year's study of the chemical, biochemical, and biological characteristics of film at the different levels of a biofilter and a standard filter supports the view that differences between the two filters are only quantitative and pertain to rates rather than to qualitative differences in the mechanism of purification. Both types of filter remove materials from sewage by adsorption and "colloider" action, and in both types biological oxidation of the materials removed is of vital importance.

The difference between the filters consists in the relative magnitude of each type of action. As the quantity of load increases, the relative role played by adsorption as against oxidation increases. However, with an average loading of 1.4 lb. B.O.D. per cu. yd. per day of the biofilter studied, biochemical oxidation plays an important part as evidenced by an increase in ash, and a decrease in B.O.D., grease and nitrogen with increasing depth and higher temperatures during the summer. The biofilter has an established nitrifying flora, although the filter may not produce an appreciable quantity of nitrites and nitrates.

The protozoan fauna of the biofilter and that of the standard filter are similar both quantitatively and qualitatively.

Court Finds Basic Defects In Engineer License Law

Contents in Brief—An engineer license law for the state of Illinois, which was passed in 1941, was declared to be unconstitutional by the state's Supreme Court in September. The court found that the act delegated legislative authority to the committee set up to administer the law, found the act so lacking in definiteness as to what constitutes the practice of professional engineering as to be unenforceable and declared that the act's provisions respecting examinations were inequitable.

ELEMENTS common to most state laws for the licensing of professional engineers were found by the Illinois Supreme Court to have fundamental defects when that court came to review the findings of a lower court that the recently passed state law was unconstitutional.

The Illinois license law was passed in 1941 and would have become effective in August, 1944, had not the state been enjoined from putting it into effect by a suit instituted by a taxpayer in Sangamon County at the instigation of architects in Illinois. Appeal was carried to the Supreme Court of Illinois, and on Sept. 19 that court rendered a decision holding the entire act unconstitutional.

While this decision can only have an immediate effect on the law in Illinois, the court's findings are of importance to engineers in other states having license or registration laws because most of those laws have similar if not identical wording in many sections. For example, the definition of "professional engineering" is taken verbatim from the so-called model law on which many state laws are based.

Excerpts from the Illinois Supreme Court decision are given below:

Appellee's attack on the validity of the act is based chiefly upon his contention that the act is so vague and indefinite in its terms that it cannot be determined what activities are included within the act and what activities are excepted from its provisions. Section I provides that, "any person practicing or offering to practice professional engineering is required to submit evidence that he is qualified so to practice and to be registered as hereinafter provided." That section further provides that "it is unlawful for any person not so registered, to practice or offer to practice professional engineering in this state."

Section 2 is a glossary. In that section, "professional engineering" is defined as follows: " 'Professional engineering' means any professional service such as consultation, investigation, evaluation, planning, design, or supervision of construction, in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works, or projects, wherein the public welfare or the safeguarding of life, health or property is concerned or involved, when such professional service requires the application of engineering principles and data."

Here we have a definition which is all-inclusive. It includes generally all professional service which requires the application of engineering principles and data. The words "engineering principles and data" are not defined in the act. They have no fixed and definite meaning. Engineering service and the application of engineering principles and data extend to many different vocations and employment.

An examination of Webster's New International Dictionary, Second Edition, shows that the terms "engineer" and "engineering" are used in connection with, and applied to, the activities of numberless professions and vocations, as well as to various activities in countless undefined operations. The use and meaning of those words in modern commerce and industry are practically unlimited. The activities which they include and to which they may aptly refer cannot be definitely classified or limited within any general definition.

The definition of professional engineering in Section 2 is no definition at all. It is but an attempt to delegate to the Department of Registration and Education the power to determine whether a person who renders any service involving the application of engineering principles and data shall be required to secure a license under the act. This is manifest by the language used in other sections of the act.

Section 3 provides for an examining committee to be appointed by the director of the department. Section 4 provides the qualifications of committee members. Other than the requirement that they be citizens of the United States and residents of this state, the only requirements are that they have been engaged in the practice of engineering for at least twelve years and have been in charge of engineering work for at least five years.

Section 7 provides the qualifications of applicants for registration under the act. Subsection (b) of Section 7 provides that an applicant shall be entitled to receive a certificate of registration if he successfully passes a written, or written and oral, examination, designed to show knowledge and skill approximating that attained through graduation from an approved four-year engineering curriculum and has had eight years or more of experience in engineering work of a "character satisfactory to the committee" and indicating the applicant is competent to practice professional engineering.

Section 9 provides that the scope of the examination and the procedure in connection therewith shall be prescribed by the committee with special reference to the applicant's ability to design and supervise professional engineering work so as to insure the safety of life, health and property. In the discretion of the committee, an applicant may be permitted to select from groups of questions pertinent to several branches of engineering, the group which, in the opinion of the applicant, most nearly covers his professional engineering experience.

This provision for letting the individual select the field in which he is to be examined is unusual for a state issuing a blanket license. States that examine in a single field generally issue a license limited to that field.

Continuing its criticism of the law, the court said further:

Section 10 provides that the successful applicant shall be given a certificate as a registered "professional engineer" of Illinois. This certificate will authorize him to engage in any activities or work included within any branch of the term "professional engineer," as defined in the act, regardless of whether he has any qualifications or has had any experience in the particular branch of engineering in which he may engage. If the answers of the applicant to the questions selected by him satisfy the committee that he is competent to practice any branch of engineering, for instance that branch of engineering relating to the construction of highways, he is licensed not only in that branch but as a mining engineer, an aeronautics engineer, a petroleum engineer, an automotive en-

neer, and all of the hundreds of other rious kinds of engineers known to the r expanding and undefined vocabulary modern science and industry.

The only restriction on the department issuing the license is that the appli- nt, in the opinion of the committee, has tisfactorily met all the requirements of e act. But nowhere in the act are these quirements of the act defined. Such quirements are left to the opinion and scretion of the committee. There are no andards or requirements in the act to ide or direct the committee in the forma- on of its opinion as to what the require- ents of the act are. There is no more xible word in our language than the ord engineer. It is matter of common owledge that many unlicensed persons ve been operating in Illinois for years der the pseudonym of "engineers," as a fuge from the penalties of the law. The rm includes everything, but defines thing.

The act itself provides no qualifications training, nor does it prescribe the char- ter of the questions to be propounded the applicant, or the subjects to which ch questions shall relate. This is left tirely to the "opinion of the committee." he committee is given no guide by the t in the selection of the questions or the determinations of the qualifications the applicant. The result is that the gislature has simply delegated to the De- rtment of Registration and Education e power to require all those to register ho, in the opinion of the committee, are gaged in rendering any professional serv- e wherein the public welfare or safeguard- g of life, health or property is concerned, ovided only, that such service requires e application of engineering principles nd data. This is clearly a delegation of gislative power to ministerial officers in iolation of the constitution. In the case f People *v.* Schaeffer, this court declared valid a section of the Medical Practice ct relating to the licensing of osteopaths, hich provided that the examination "shall e of a character sufficiently strict to test eir qualifications as practitioners."

The questions as to whom the act will pply, the qualifications for a certificate, nd the means employed to demonstrate hose qualifications are to be found only n the opinion of the committee. No stand- rds are fixed by the act to guide their ncontrolled discretion. The committee ay apply one standard to some applicants nd another standard to others. The com- ittee may base its opinion that the appli- ant has satisfactorily met the requirements f the act at one time upon certain stand- rds as to such requirements, and at other imes upon different standards entirely. The pinion of the committee as to the require- ents of the act would be subject to change with each change in the personnel of the committee.

No one can determine from reading the ct the activities to which it is directed. The determination of those activities must await the opinion of ministerial officers to whom it is delegated by the act. No one can determine whether he comes within the act by reading the act itself. No one can determine from the act the necessary requirements to entitle him to an examination or to obtain from the committee its opinion that he has satisfactorily met all the requirements of the act. The provision that he must meet all the requirements of the act is meaningless because there are no requirements set out in the act. Until the committee acts no one may know what those requirements are. This is clearly a delegation of legislative power to ministerial officers in violation of Section 2 of Article II and Section I of Article IV of the constitution. The law cannot rest in the opinion of ministerial officers.

The act, by the definition of "professional engineering" in Section 2, first includes all services requiring the application of engineering principles and data wherein the public welfare or the safeguarding of life, health or property is concerned. Then by Section 29 it attempts to exclude from that definition and from the act, among other things, "The practice of any other recognized profession or trade." For the reasons above pointed out, the language of this exclusion is likewise so indefinite that no one can determine who is excluded from the provisions of the act. For the reasons already stated, Section 29 is vague, uncertain, incomplete indefinite and incapable of enforcement, or administration.

The provisions relating to the activities which shall and those which shall not be included in the act are so vague and uncertain as to render the act incomplete when it left the legislature. When sections 2 and 29 are considered together, in the final analysis, the Department is given the uncontrolled and unlimited power to determine those against whom it will enforce the act and those against whom it will not enforce it. The power of legislation is thus unlawfully delegated to the department and to the committee provided for in Section 3 of the act. The act cannot be sustained.

This is the first time that a state license law has been attacked and found unconstitutional on such fundamental grounds. The original Pennsylvania law was declared unconstitutional on the ground that it was discriminatory in that employees of corporations engaged in interstate commerce were exempted without qualification. The scope of the definition of professional engineering has not heretofore been brought into question.

Test cases in Tennessee

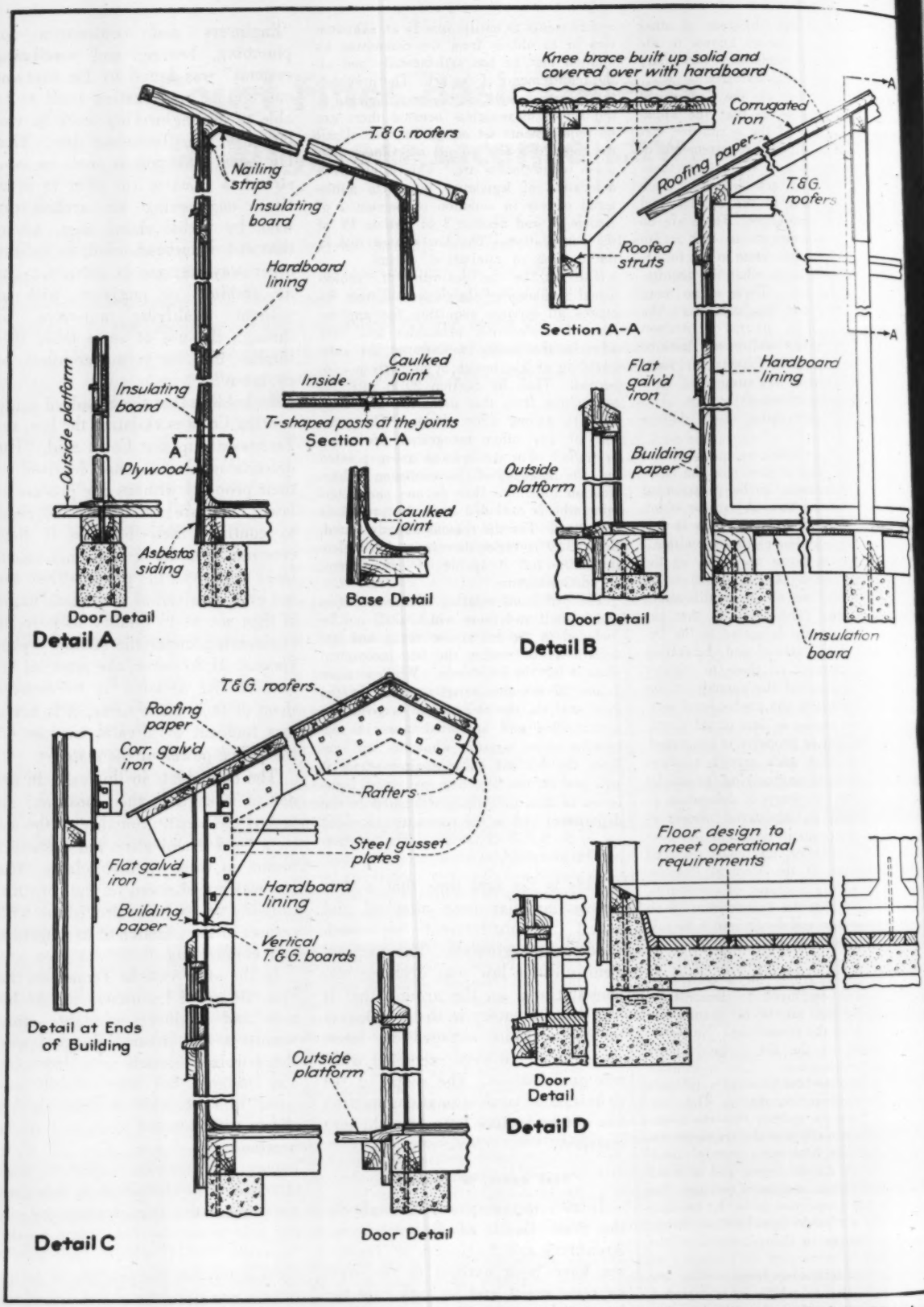
In two instances, suit brought by the State Board of Examiners for Architects and Engineers in Tennessee have been carried to the state supreme court and in each case the law has been upheld.

In one of these cases a plumbing firm that called itself the "Standard Engineering Company" and described itself on its letterhead as "Engineers and contractors for plumbing, heating and ventilating systems" was found by the supreme court to be representing itself to be able to do engineering work in violation of the Tennessee law. That law says: "A person shall be construed to practice (or offer to practice) engineering or architecture who, by verbal claim, sign, advertisement, letterhead, card, or in any other way, represents himself to be an architect or engineer, with or without qualifying adjective, or through the use of some other title implies that he is an architect or engineer."

In holding that the Standard Engineering Co. was violating the law, the Tennessee Supreme Court said, "The defendants here are not deprived of their property without due process of law. They are not denied the right to continue their business if they continue it under a name not calculated to mislead the public. They are not even deprived of their trade name if they see fit to qualify to practice engineering under the statutory provisions. If, however, the practical effect of the decision is to deprive them of their trade name, it is but a loss incident to a valid exercise of the police power of the state."

The defendants in this case, in order to strengthen their position, attacked the constitutionality of the act on a legal technicality, but the court found no value in their claim. The law was not attacked on the constitutionality of its basic provisions with respect to the practice of architecture and engineering.

In the other case in Tennessee, the State Board of Examiners for Architects and Engineers brought action against a man named Rodgers who characterized himself as a decorator and designer but who actually entered into contract to furnish his clients with detailed plans and specifications for construction of their houses and even to supervise construction. The defendant in this case questioned the constitutionality of the act, hence the case went to the Supreme Court where the state's right to regulate the practice of architecture was upheld and the defendant was found to be violating the law. The court said that if the defendant's practice involved public safety it came within the scope of the law regardless of what he called himself.



Three designs adaptable for small timber structures to overcome the hazard of inflammable or explosive atmospheres. Detail A shows construction of a narrow building where roof span requires only rooters of proper thickness without intermediate support. Detail B is adaptable for a large building requiring intermediate support for roof and heavy timber frame for rigidity. Detail C illustrates a long building where intermediate roof supports would be impractical. Arch roof supports and steel gusset plates have been incorporated in this design.

Buildings for Inflammable Atmospheres

D. G. Williams
Chief Engineer, Trojan Powder Co.
Allentown, Pa.

HIDDEN POCKETS in the construction of floors, walls, partitions and roofs of industrial plants, where the manufacturing processes involve inflammable, explosive or dusty and gaseous atmospheres, have been the source of considerable trouble—sometimes causing disasters. Inflammable dusts and gases cannot be removed regularly from these hidden spaces. Thus, when a fire breaks out in an operating area, the inaccessibility of these hidden pockets makes it impossible to attack the fire with ordinary fire-fighting equipment without first having to tear out large sections of floors, walls, partitions or roofs. This means unnecessary destruction.

Design for small timber buildings

A type of construction has been developed to overcome this difficulty in relatively small operating buildings, such as timber structures commonly used in the explosive manufacturing industry. No credit is claimed for having originated this general method of construction, but its practical application to this particular kind of industrial building may be new. All floors, walls, partitions and roofs are designed and built as solid structures with the elimination of hidden pockets and open surface joints. A design can be evolved to meet almost any special requirement.

There are a variety of materials that can be used for exposed surfaces to meet exposure to weather, fire, or fumes; insulating boards can be applied to reduce heat transfer; fire or flame-proofed lumber can be employed if required; plywood can be used if surfaces are not too extended; and tongue and grooved lumber of almost any thickness is suitable to obtain the strength required. Exterior surfaces can be glued in place if desired, and joints can be filled with properly chosen flexible caulking compounds. Practically any type of floor covering can be installed.

One point must be borne in mind; this type of construction results in a tight building and if any pressure exists or may exist inside the building at any time, proper provision must be made for its relief.

Several variations of this general type of construction are shown in the accompanying drawing. Its use in a relatively small narrow building is shown in Detail A, where the roof span can be taken care of by using roofers of proper thickness without intermediate support, and where side and end walls can be made up of plywood sheets with T-shaped posts at the joints for stiffening and to obtain tightness. The design has fixed window sash, covered flooring and a painted interior lining which permits of complete hosing out without damage to the building.

The design shown in Detail B is adapted to a large building with roof span that requires intermediate support and with a relatively heavy timber framework for rigidity. In this particular case, side walls are constructed of vertically placed T&G boards with hardboard lining glued and nailed to the interior surface and with joints caulked. The exterior surface is flat galvanized iron over building paper. Horizontal interior beams and braces are roofed to prevent dust collecting ledges. No insulating board was deemed necessary in this instance, but it can be used if required.

The same general type of construction as shown in Detail B is illustrated in Detail C, but adapted to long buildings where such intermediate roof supports as are shown in Detail B would become impractical because of their required section. This design uses arch supports for the roof and instead of the steel gusset plates, commercial glued timber arches could be substituted.

Floor construction with raised sills and protected curbs, as shown in Detail D can, if necessary, be adapted in buildings where the manufacturing processes involve the spillage of corrosive liquids.

All of the designs described have been constructed and are in active use—some of them for a period of several years.

Municipal Central Heating System Serves Whole City

First and only city in the country where a central heating system provides heat for the entire population is Virginia, Minn. In that community all homes, stores, schools and churches are served from steam mains running through every street in town, temperature in the individual houses being controlled by a thermostat in each.

The system is municipally owned and operated as a non-profit enterprise. Cost figures are especially interesting because of the community's location in northern Minnesota, where winter conditions are severe. The plant is said to burn 43,000 tons of bituminous coal a year, at a cost of $7 per ton. The average householder occupying a 5-room house pays $70 a year to heat his house and hot water, about half the cost for heating on an individual basis. Differing ability of the householder to economize and properly operate his heating system naturally results in variations from this average.

In addition, the steam is first used to generate electricity before it is piped into homes and business establishments, the community profiting through this auxiliary use of the central plant. Lower cleaning bills, less laundry and fewer colds are some of the incidental benefits that have resulted from the virtual smokelessness of the city since the central plant's establishment. Also, the refuse collection problem has been simplified by the elimination of ash receptacles, and fire losses in dwellings are said to be 40 percent lower than formerly.

ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Field and Office Items from the Pacific

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

Removable Armor for Seabee Bulldozers

As soon as bulldozers began to be used in Pacific combat areas, it was soon evident that without armor protection operators become choice targets for Jap snipers. To meet this condition the Seabees built a type of armor that would stop 50-caliber bullets and yet could be hoisted on and off in one piece. The ability to remove the armor easily is a desirable feature because in regular operation the operator cannot work as effectively with the armor up around him, limiting his vision to what he can see through a narrow slit.

The armor consists of several separate pieces which are small enough so that the assembly on the tractor can be made rapidly by hand if no equipment is available for lifting and placing the assembled armor in a single unit.

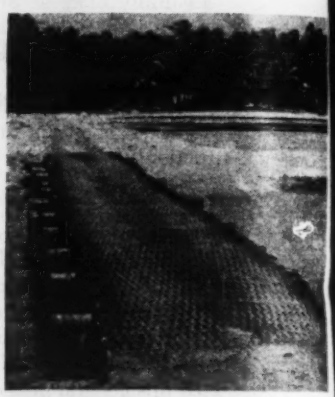
In the first experiments with this armor the enclosed compartment became excessively hot, but this was quickly remedied by reversing the direction of the air blast driven by the fan. Fresh air is now drawn continually into the operator's compartment through a heavy steel screen at the top, thus keeping the temperature in the compartment very nearly the same as the outside air and free of fumes.

Access to the engine is gained by removing one or both of the side plates; an inspection hole is provided for checking the oil level. The bulldozer shown in the accompanying picture is an Allis-Chalmers HD-14 equipped with a Baker hydraulic unit. However, with a simple cutting torch operation the outfit can be modified to fit other makes of tractor and bulldozer gear.

The design for this equipment was developed at a heavy machinery repair depot of the Seabees in the South Pacific which is operated under the supervision of Comdr. W. E. Guest, Chicago, Ill.

Marston Mat Bridge Deck

Because of scarcity of construction materials, the great quantity of Marston mat or pierced steel plank in the Pacific not used on airstrips is being



adapted to many uses. In the accompanying picture it surfaces a bridge spanning an inlet between adjacent islands. The substructure is entirely of coconut logs.

Front and rear views of a bulldozer with complete armor plate protection for the driver. The air intake is through the steel screen at the top.

It takes a TOUGH Air Compressor for jobs like this!

In tough construction jobs, where compressed air is needed and the going is rough, use a Schramm Air Compressor.

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

PUMPING PLANTS, KLAMATH PROJECT, OREGON-CALIFORNIA

OWNER: Bureau of Reclamation, Modoc Unit, Tule Lake Division, Klamath Project, Oregon-California, Klamath Falls, Ore.

PROJECT: Excavation, backfill, grading and placing of gravel and dry-rock paving; construction of three pump houses (A, B, and C), each complete with substructure, intake structure and superstructure; construction of three 30-in. discharge lines for each plant; outlet structures for each plant; placing of concrete canal lining in canal over completed discharge line for Plant A; install structural steel and miscellaneous metalwork, conduits, conductors, hand-operated hoist and trolley for Plant C, flap valves, motor-driven pumping units. Substructures, intake structures and discharge lines for Plants A and B to be of concrete; foundation slab for pump house at Plant A to be supported on timber piles; substructure and discharge lines for Plant C to be of wood construction, except for concrete foundation slabs under the pump house and the concrete collars for supporting discharge lines at building wall. Round timber piles to support pump house for Plant C and timber sheet piling to be driven to form sides of intake. Pumphouse superstructures for three plants to be wood-frame construction, and include hoist framework, and hatch openings with removable covers in roofs. Plants A and B are identical, except for door and window locations. Project is located near Tulelake, Calif.

CONDITIONS: Government to furnish cement; pumping units, complete; flap gates; machinery enamel; and all materials for electrical installations except structural steel angles, roof-flashing sleeves, plugs for plugging conduits, and paint and soldering materials required for making electrical connections. Government-furnished material to be delivered to contractor at railway station most convenient to the work. Time for completion: 180 calendar days. Access to work from existing roads to be provided by contractor. Wage rates are: skilled labor, $1.25 to $1.75 per hour; semi-skilled, 75c. to $1.25; and common labor, 85c.

BIDS: Five bids were received July 28, 1944 on the three plants combined. They range from the low of $90,688 to $131,900.

LIST OF BIDDERS:

1.	Clifford A. Dunn, Klamath Falls, Ore. (contract)	$ 90,688
2.	Tru-Mix Concrete Co., Medford, Ore.	104,555
3.	S. Relyea & Sons, Boise, Idaho	110,000
4.	Scheumann & Johnson, Seattle, Wash.	123,985
5.	Arthur Pinner, Jr., Los Angeles, Calif.	131,900

Schedule 1—Pumping Plant "A"

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	3,000 c. y.	$2.65	$2.00	$1.00
2. Backfill	1,200 c. y.	.50	1.00	.60
3. Compacting backfill	500 c. y.	1.00	1.00	4.00
4. Furn. and place dry-rock paving	26 s. y.	5.00	6.00	4.00
5. Furn. and place gravel around weep holes	15 c. y.	5.00	10.00	15.00
6. Conc. in substructure of pumphouse	239 c. y.	34.00	40.00	45.00
7. Conc. in discharge lines and outlet	80 c. y.	52.00	50.00	50.00
8. Conc. in canal lining for "J" canal	23 c. y.	30.00	30.00	35.00
9. Reinforcement bars	46,000 lb.	.09	.11	.07
10. Construct contraction joints in discharge lines	9 ea.	25.00	50.00	75.00
11. Constr. water-seal joints in disch. lines	3 ea.	86.00	50.00	50.00
12. Furn., drive vertical timber piles	560 l. f.	1.70	3.45	3.50
13. Furn., drive batter timber piles	665 l. f.	1.95	3.95	4.00
14. Construct pumping plant	Lump Sum	2,400.00	4,000.00	8,509.10
15. Install flap gates	2,800 lb.	.06	.25	.10
16. Furn., install welded plate-steel discharge pipe connections	6,800 lb.	.20	.30	.30
17. Miscellaneous metalwork	8,500 lb.	.22	.30	
18. Install pumping units	25,000 lb.	.04	.02	
19. Install electr. metal conduit, under 1-in. dia.	200 l. f.	.50	.45	
20. As above, 1 to 2½-in. dia.	70 l. f.	2.00	1.80	
21. As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50	
22. Install electrical conductors, ground wires and apparatus	2,100 lb.	.34	.31	

Schedule 2—Pumping Plant "B"

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	970 c. y.	$2.50	$2.00	$1.00
2. Excavation, rock	535 c. y.	5.00	4.00	3.00
3. Backfill	550 c. y.	.50	1.00	.60
4. Compacting backfill	50 c. y.	1.00	1.00	4.00
5. Furn. and place dry-rock paving	40 s. y.	5.00	6.00	4.00
6. Conc. in substructure of pump house	190 c. y.	30.00	40.00	45.00
7. Conc. in discharge lines and outlet	59 c. y.	52.00	50.00	50.00
8. Furn. and place reinforcement bars	37,000 lb.	.09	.11	.07
9. Constr. contraction joints in discharge lines	9 ea.	25.00	50.00	75.00
10. Constr. water-seal joints in discharge lines	3 ea.	86.00	50.00	50.00
11. Construct pumping plant	Lump Sum	2,400.00	4,000.00	8,509.10
12. Install flap gates	2,800 lb.	.06	.25	.10
13. Furn., install welded-plate steel discharge pipe connections and float guides	6,800 lb.	.20	.30	.30
14. Miscellaneous metalwork	11,500 lb.	.22	.30	.30
15. Install pumping units	25,000 lb.	.04	.02	.06
16. Install electr. metal conduit, under 1 inch	260 l. f.	.50	.45	.10
17. As above, 1 to 2½-in. dia.	80 l. f.	2.00	1.80	.12
18 As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50	.15
19. Install electr. conductors, ground wires, and apparatus	2,100 lb.	.34	.31	.06

Schedule 3—Pumping Plant "C"

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	1,650 c. y.	$4.50	$3.00	$1.00
2. Backfill	550 c. y.	.50	1.00	2.00
3. Compacting backfill	50 c. y.	1.00	1.00	4.00
4. Furn. and place dry-rock paving	40 s. y.	5.00	6.00	4.00
5. Furn., place gravel around weep holes and pump house	200 c. y.	5.00	10.00	15.00
6. Conc. in foundation slabs of substr.	50 c. y.	30.00	45.00	40.00
7. Conc. in collars and outlet for discharge lines	25 c. y	60.00	55.00	50.00
8. Furn., place reinforcement bars	10,000 lb.	.09	.11	.07
9. Furn., drive vertical timber piles	650 l. f.	2.00	5.75	3.50
10. Furn., drive batter timber piles	300 l. f.	1.90	3.95	4.00
11. Furn., fabricate, drive timber sheet piling	2.5 M bm	200.00	250.00	182.60
12. Construct pumping plant	Lump Sum	5,686.00	4,250.00	10,240.20
13. Furn., install wood discharge lines	Lump Sum	1,227.60	1,200.00	1,180.00
14. Install flap gates	2,800 lb.	.06	.25	.10
15. Furn., install welded-plate steel discharge pipe conn. and float guides	6,800 lb.	.20	.35	.30
16. Miscellaneous metalwork	2,000 lb.	.22	.25	.30
17. Install pumping units	25,000 lb.	.04	.04	.06
18. Furn., install 5-ton hoist and trolley	Lump Sum	650.00	350.00	600.00
19. Inst. electr. metal conduit, 1-in. or less in dia.	240 l. f.	.50	.45	.10
20. As above, 1 to 2½-in. dia.	100 l. f.	2.50	1.80	.12
21. As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50	.15
22. Instal electr. conductors, ground wires, and apparatus	2,100 lb.	.34	.31	.06

HIGHWAYS, WEST VIRGINIA

OWNER: West Virginia State Road Commission, Charleston.

PROJECT: Grading, draining and concrete paving 1.295 miles of St. Albans-Lewis Road in Kanawha County, West Virginia. Includes clearing and grubbing; 246,100 cu. yd. of borrow excavation; 9,000,000 station yards of overhaul; macadam base course 8-in. thick for portion of length; drainage structures; timber piling for culvert; and other work necessary for completion of project.

CONDITIONS: Contractor to furnish all material and complete work in 225 working days. Rail, highway and water transportation facilities available. Wage rates are: skilled labor, $1.625 per hour; semi-skilled, $1.375; and common, 75c. Scarcity of trucks for hauling and labor shortages might affect final cost.

(*Contract Unit Prices continued on page 84*)

The Japs Want HEIWA *

when they see equipment like this!

Model 12 digging wheel type trencher digging trench in coral rock for cable on Eniwetok Island in the Marshalls.

The average Jap soldier, with his limited knowledge of the world outside Japan, had no idea of what he was up against until he came in contact with the highly mechanized equipment used by Uncle Sam's fighting forces.

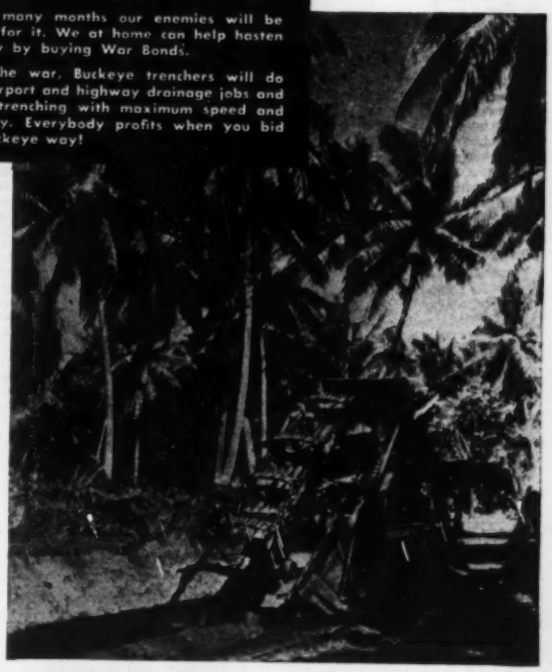
When, for instance, he saw Buckeye trenchers digging trench in minutes that would take a whole company of Japs days to dig, he wanted "heiwa"—*peace*—badly.

Trenchers cannot win a war, but the speed with which we are progressing in the Pacific conflict is due in no small measure to fast, compact, soundly engineered construction equipment like these Buckeye trenchers. They take tough coral rock in their stride, are simple to operate and easy to maintain—important when repair parts are miles away and replacements not always convenient.

Buckeye Traction Ditcher Co.
Findlay, Ohio

* Before many months our enemies will be asking for it. We at home can help hasten the day by buying War Bonds.

After the war, Buckeye trenchers will do your airport and highway drainage jobs and utility trenching with maximum speed and economy. Everybody profits when you bid the Buckeye way!



Model 160 digging ladder type trencher digging trench for cable on Majuro Atoll, South Pacific. Official U. S. Navy photos.

Built on **Buckeye**

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

(*Contract Unit Prices continued from page 82*)

BIDS: Seven bids were received August 29, 1944, ranging from the contract low of $476,697 to $661,467.

LIST OF BIDDERS:

1. Smith Construction Co., Huntington, W. Va., (contract) — $476,697
2. Price Construction Co., Huntington, W. Va. — 532,830
3. W. H. Ringwald Sons Co., Chillicothe, Ohio — 534,969
4. McHugh Brothers, Springfield, Ohio — 538,381
5. Murphy Construction Co., Morgantown, W. Va. — 578,140
6. Stellhorn & Beightler, Columbus, Ohio — 599,697
7. Pinnell & Pfost, Ripley, W. Va. — 661,467

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	30.5 ac.	$150.00	$300.00	$250.00
2. Unclassified excavation	6,110 c. y.	.70	1.00	1.00
3. Borrow excavation	246,100 c. y.	.74	.80	1.05
4. Overhaul	9,000,000 sta. y.	.005	.005	.005
5. Structure excavation	7,140 c. y.	3.00	4.00	2.75
6. Macadam base course, 8-in.	315 s. y.	7.00	8.00	9.00
7. Traffic bound base, limestone	2,830 ton	6.00	5.00	5.50
8. Limestone prime	90 ton	7.00	8.00	6.50
9. Tar prime	3,500 gal.	.20	.20	.18
10. Asphalt conc. pavmt. wearing crse.	83 ton	14.00	15.00	16.00
11. Concrete pavement	23,510 s. y.	3.00	3.50	2.80
12. High early strength concrete	4,050 s. y.	3.30	4.00	2.99
13. Transverse expansion joint	4,780 l. f.	.40	.30	.40
14. Longitudinal expansion joint	1,280 l. f.	.25	.25	.30
15. Pavement reinforcing	114,790 lb.	.08	.08	.075
16. Dowel bars	25,070 lb.	.09	.10	.10
17. Tie bars	5,960 lb.	.09	.10	.09
18. 18-in. rein. conc. pipe	4,650 l. f.	3.00	3.50	2.50
19. 24-in. rein. conc. pipe	2,120 l. f.	4.50	6.00	3.75
20. 36-in. rein. conc. pipe	360 l. f.	10.00	8.50	7.00
21. 24-in. rein. conc. pipe, ext. str.	340 l. f.	5.00	7.00	4.55
22. Timber piling	6,650 l. f.	1.90	2.00	1.80
23. Class A concrete	435 c. y.	38.00	40.00	32.00
24. Class B concrete	148 c. y.	35.00	39.00	33.50
25. Reinforcing steel	51,850 lb.	.09	.08	.075
26. Paint coat waterproofing	740 s. y.	1.50	1.00	1.65
27. White faced curb	2,400 l. f.	1.20	1.30	1.15
28. Integral curb	2,825 l. f.	1.00	1.00	.57
29. Concrete gutter	112 s. y.	5.00	5.00	4.50
30. Concrete sidewalk	13,300 s. f.	.35	.40	.30
31. Drop inlet castings	54 ea.	30.00	40.00	29.00
32. Manhole frames and covers	12 ea.	30.00	50.00	40.00
33. Drop inlets, except castings	59 ea.	75.00	100.00	65.00
34. Manholes, except castings	12 ea.	150.00	200.00	110.00
35. Median strip inlets	7 ea.	60.00	100.00	70.00
36. Rope type guard rail	4,103 l. f.	.90	1.00	1.10
37. End anchors	12 ea.	30.00	50.00	30.00
38. Intermediate anchors	6 ea.	30.00	50.00	25.00
39. Extra length posts	525 l. f.	.50	1.00	.50
40. Special rock fill	1,450 c. y.	2.50	3.00	1.50
41. Project markers	5 ea.	30.00	25.00	25.00
42. Water for compaction	215 M gal.	6.00	7.00	3.00
43. Concrete cribbing	53 c. y.	80.00	100.00	85.00
44. Traffic bound slag (alternate)	2,519 ton	6.00	No Bid	5.65
45. Woven wire guard rail (alternate)	4,103 l. f.	.90	No Bid	1.20
46. End anchors (alternate)	12 ea.	30.00	No Bid	30.00
47. Intermediate anchors (alternate)	1 ea.	30.00	No Bid	25.00
48. Extra length posts (alternate)	525 l. f.	.50	No Bid	.50

HIGHWAY AND BRIDGES, PENNSYLVANIA

OWNER: Pennsylvania Dept. of Highways, Harrisburg.

PROJECT: Construction of highway and bridges (25,585-ft. long) in East Hanover, Union and Swatara Townships in Lebanon County, Pa., Traffic Routes 22 and 72. Involves construction of reinforced cement concrete pavement 24-ft. wide on graded roadway having nominal width of 68 to 72 ft.; divided highway consisting of reinforced cement concrete pavement 24- ft. wide on each side of a divisor area; reinforced cement concrete pavement 24-ft., 36-ft. and variable to 50.5-ft. wide; native stone Type A or crushed aggregate base with a bituminous surface 36-ft., 14-ft. and variable in width; three reinforced concrete bridges and grading 98 to 102 ft. wide; and also six reinforced concrete structures.

CONDITIONS: Contractor to furnish all materials and complete work in 370 calendar days. Preference rating on project is AA-3. Contractor to employ forces a minimum of 16 hours per day beginning about April 1, 1945 on all items in connection with drainage and bridge structures; on all other items, a minimum of 10 hours per day. Rail and highway transportation facilities available. Minimum wage rates specified are: skilled labor, $1.00 per hour; intermediate grade labor, 85c.; and unskilled, 65c.

BIDS: Eleven bids were received October 24, 1944, ranging from the contract low of $1,225,752 to $1,630,252.

LIST OF BIDDERS:

1. Potts & Callahan Contracting Co., Inc., Baltimore Md. (contract) — $1,225,752
2. C. W. Good, Inc., Lancaster, Pa. — 1,278,442
3. Lane Constr. Corp., Meriden, Conn. — 1,290,980
4. Bero Engr. & Constr. Corp., Buffalo, N. Y. — 1,295,799
5. Cayuga Constr. Corp., New York, N. Y. — 1,346,878
6. National Structures Corp., New York, N. Y. — 1,373,615
7. B. Perini & Sons, Inc., Framingham, Mass. — 1,386,622
8. Arthur A. Johnson Corp., Long Island City, N. Y. — 1,432,000
9. Johnson, Drake & Piper, Inc., New York, N. Y. — 1,452,953
10. S. J. Groves & Sons Co., New York, N. Y. — 1,469,355
11. Central Engineers, Hollidaysburg, Pa. — 1,630,252

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	$4,000.00	$3,000.00	$20,000.00
2. Class 1 excavation	425,694 c. y.	.49	.54	.55
3. Class 2 excavation	9,604 c. y.	2.75	2.75	2.25
4. Borrow excavation	163,868 c. y.	.49	.45	.30
5. Crushed stone	500 ton	3.00	3.75	3.00
6. Subgrade	133,845 s. y.	.12	.12	.15
7. Shoulders	32,967 l. f.	.20	.20	.20
8. Native stone or crushed aggr. base crse., 8-in. in depth	6,485 s. y.	1.25	1.25	1.50
9. As above, 10-in. in depth	992 s. y.	1.50	1.45	1.75
10. Aggregate surfacing	355 ton	3.00	3.00	2.50
11. Calcium chloride	4 ton	50.00	45.00	45.00
12. Plain cem. conc. pavmt., 6-in. uniform	1,978 s. y.	2.50	2.70	2.75
13. Rein. cem. conc. pavmt., 8-in. uniform	2,294 s. y.	2.85	3.16	3.00
14. Rein. cem. conc. pavmt., 9-in. uniform	121,581 s. y.	2.99	3.16	3.15
15. Spec. rein. cem. conc. pavmt., 9-in. uniform	535 s. y.	3.50	3.60	4.25
16. Pl. cem. conc. wearing surf., bridge floor	2,634 s. y.	2.00	2.30	1.50
17. Bitum. surf. crse., stone aggr.	248 ton	8.00	9.50	9.00
18. Bitum. surf. crse., 2-in. uniform (CP-2)	5,376 s. y.	1.10	1.10	1.00
19. Class A concrete	3,658 c. y.	37.00	36.00	43.00
20. Class B concrete	3,730 c. y.	25.00	26.00	28.00
21. Plain steel bars	1,059,703 lb.	.053	.05	.06
22. Plain structural steel	42,680 lb.	.07	.06	.06
23. Fabricated structural steel	80,200 lb.	.12	.17	.12
24. Stone backfill for structures	30 c. y.	8.00	3.80	6.00
25. Conc. test piles (4 piles, each 43-ft. long)	Lump Sum	1,720.00	950.00	750.00
26. 44-ft. concrete piles	264 l. f.	6.00	5.00	3.50
27. 38-ft. concrete piles	380 l. f.	6.00	5.00	3.50
28. 32-ft. concrete piles	508 l. f.	6.00	5.00	3.50
29. Pressure grout surfacing	184 s. y.	9.00	6.00	7.00
30. Mortared stone slope wall	620 c. y.	23.00	26.00	15.00
31. Mortared stone slope wall (spillway)	64 c. y.	30.00	26.00	20.00
32. Cl. B cem. conc. pavmt. for str. beds, 6-in. depth	11 c. y	30.00	20.00	40.00
33. Grouted rubble paving for stream beds	64 c. y.	20.00	22.00	25.00
34. Type F-1 endwalls, incl. rails	2 ea.	200.00	165.00	200.00
35. Type F-2 endwalls, incl. rails	15 ea.	200.00	150.00	190.00
36. Special A endwalls	2 ea.	200.00	115.00	175.00
37. Type D inlets	7 ea.	150.00	105.00	150.00
38. Type E inlets	18 ea.	125.00	85.00	140.00
39. Type G inlets	9 ea.	125.00	115.00	165.00
40. Type J inlets	8 ea.	125.00	200.00	175.00
41. 15-in. rein. cem. conc. pipe	1,020 l. f.	2.75	3.00	2.50
42. 18-in. rein. cem. conc. pipe	2,444 l. f.	3.50	4.00	3.25
43. 24-in. rein. cem. conc. pipe	2,022 l. f.	4.50	5.50	4.50
44. 30-in. rein. cem. conc. pipe	306 l. f.	6.50	8.50	6.25
45. 36-in. rein. cem. conc. pipe	506 l. f.	7.00	7.00	6.00
46. 48-in. rein. cem. conc. pipe	126 l. f.	12.00	11.60	10.00
47. 72-in. rein. cem. conc. pipe	36 l. f.	21.00	21.70	25.00
48. 36-in. ext. str. rein. cem. conc. pipe	672 l. f.	7.50	7.70	6.50
49. 15-in. plain. cem. conc. or vit. clay pipe	234 l. f.	2.40	2.60	2.25
50. 24-in. plain. cem. conc. or vit. clay pipe	104 l. f.	3.90	5.10	4.00
51. 30-in. plain. cem conc. or vit. clay pipe	110 l. f.	6.00	7.90	6.00
52. 36-in plain. cem. conc. or vit. clay pipe	60 l. f.	6.50	6.60	6.00
53. 18-in. rein. conc. pipe relaid	42 l. f.	2.00	2.60	3.00
54. 4-in. tile underdrain	20,500 l. f.	1.00	1.10	1.00
55. 6-in. tile underdrain	180 l. f.	1.20	1.20	1.25
56. 4-in. tile found'n. underdrain, Type A	4,900 l. f.	.90	.95	1.00
57. 4-in. tile outlets	800 l. f.	.90	1.05	.75
58. 6-in. tile outlets	124 l. f.	1.20	1.15	1.00
59. White conc. reflecting curbing, Type A	428 l. f.	1.50	1.80	1.25
60. White conc. reflecting curbing, Type B	34,944 l. f.	1.55	1.90	1.50
61. Subgrade drains	25,300 l. f.	.50	.40	.60
62. Grouted rubble gutter	32 s. y.	5.00	5.75	5.00
63. Plain cem. conc. gutter, type C	807 s. y.	3.50	3.35	5.00
64. Guard posts	1,078 ea.	5.00	5.50	5.00
65. Shoulder baffle	8,192 l. f.	.25	.28	.50
66. Shoulder trough	1,433 l. f.	1.00	.60	1.50
67. 8-ft. dia. foundation columns	116 l. f.	50.00	56.00	55.00

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Heil Cable Dozers are doing an outstanding job in clearing the way for our armed forces. Just as you have profited by top-notch Heil performance in your earth-moving jobs, so do the Army engineers in their efforts to move dirt as quickly as possible with a minimum of delay for service and maintenance.

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D4 or R4 tractor. This device, for use with the D4 towing winch, is simple and quick acting.

As there is only one fitting to be lubricated, this drum presents no service problems—*Hyster Co., Portland 8, Ore.*

• • •

Sheet Metal Connector Strip

Said to hold sheet metal as firmly as bolts, rivets or screws, a new self-fastening Sheetlock connector strip may soon be obtained in flat form for straight connections and angle form for corners. This strip is a double channel, with indented louvers or notches spaced uniformly at a 12-deg. angle along the sides. Protruded louvers along the edge of the metal sheet engage the notches in the strip when the sheet is pushed into the channel. Reversing this procedure disconnects sheet and strip.

Sheetlock is a labor saver, it is claimed, and its simplicity in assembly makes knock-down shipments possible. —*The Sheetlock Co., 4529-31 North Clark St., Chicago, Ill.*

• • •

Floor and Roof Slab

Fast installation is possible with a new precast and precured hollow-cast floor and roof slab, Flexicore, which is permanent and fireproof. A floor of this slab forms a level base for any composition or wood covering, while the underside makes a ceiling which needs only paint for a finish. The hollow-cast construction insulates against

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MAHON STEEL DECK *throughout*
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With the exception of the structural steel, windows and doors—commercial and industrial buildings, similar to that above, now are constructed entirely of MAHON STEEL DECK. First introduced as a war expedient for the speedy erection of factories, arsenals, warehouses, etc., this modern advancement in building construction is destined for widespread application in post-war building. Steel, throughout, such a structure assures the utmost in firesafety. A completely interlocked welded unit, it is unusually strong and substantial. It is quickly and easily erected. May be insulated or not as desired. Lasts for a life time. Properly designed, it is surprisingly low in cost... In planning your future projects you will want full particulars. Investigate this advanced new construction without delay.

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Binghamton—MacDougall Equipment Co.
Buffalo—Dow & Company, Inc.
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Olean—Freeborn Equipment Company
Oneonta—L. P. Butts, Inc.
Syracuse—Harrod Equipment Company
OHIO—Cincinnati—The Finn Equipment Company
Cleveland—Gilson-Stewart Company
Marietta—Northwest Supply & Equipment Co.
Toledo—M. W. Kilcorse & Company
OKLAHOMA
Oklahoma City—Townsco Equipment Co.
OREGON
Portland—Andrews Equipment Service
PENNSYLVANIA
Easton—Sears & Bowers
Harrisburg—N. A. Coulter
Oil City—Freeborn Equipment Company
Philadelphia—Metalweld, Inc.
Pittsburgh—Atlas Equipment Corp.
Wilkes-Barre—Ensminger & Company
SOUTH CAROLINA
Columbia—Bell-Lott Road Machinery Co.
SOUTH DAKOTA
Sioux Falls—Empire Equipment Co.
TENNESSEE
Chattanooga—James Supply Company
Knoxville—Wilson-Weesner-Wilkinson Co.
Memphis—Tri-State Equipment Company
TEXAS—Dallas—Shaw Equipment Company
El Paso—Equipment Supply Company
Houston—Dye Welding Supply Co.
San Antonio—Patten Machinery Company
VIRGINIA
Richmond—Highway Machinery & Supply Co.
WASHINGTON
Seattle—Star Machinery Company
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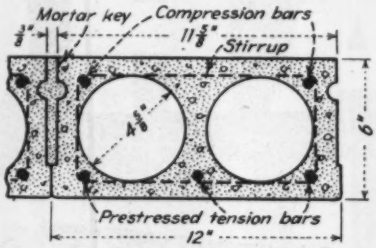
sound, as well as heat and cold, it is claimed.

The prestressed longitudinal steel bars running through Flexicore add



materially to structural strength, and are said to eliminate shrinkage cracks. The maximum span in the standard slab is 22 ft. 6 in., and present construction provides maximum fire protection for a given weight.—*Price Brothers Co., Dayton, Ohio.*

• • •

New All-Hydraulic Crane Mounted on Light Truck

A full-size truck crane, operated entirely by hydraulics, without a drum, gear, clutch, brake or separate power plant, was demonstrated in Milwaukee recently and is now ready for commercial production. Rated at 6 tons capacity, the crane is mounted on a standard 1½-ton short wheelbase truck. While operating, the entire load is carried on hydraulic-controlled outriggers, with no load on the truck frame or tires. The crane has full-circle swing, a live boom that is telescopic under load, and a single load line with a maximum run of 52 ft. All movements, except travel, can be carried on independently or simultaneously. When set for travel, the rig is 8 ft. wide, 11½ ft. high and 24 ft. long.

All operations are by a series of single-acting hydraulic rams with oil pressure supplied by three small hydraulic pumps V-belt driven from the truck driveshaft. The truck engine idling at 1,200 rpm. furnishes ample hydraulic pressure through the pumps for full-capacity crane operation. The hydraulic system is designed for 6,000 psi., though seldom is more than 2,000 psi. pressure required. The rams are exceedingly simple.

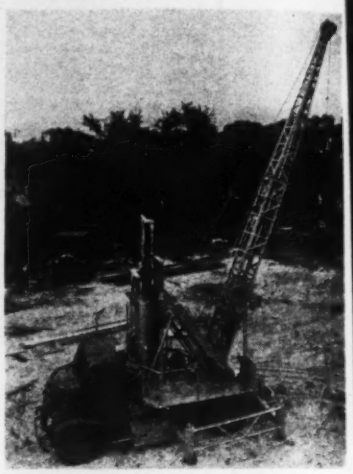
The outriggers are two horizontal pipe crossarms, each enclosing extension pipes that are pushed outwards by rams. Ram-activated pedestals can be independently operated to level up the crane frame on uneven ground. The outriggers, 6 ft. apart, extend to a maximum width of 11 ft. and can be set or withdrawn in a few seconds.

The boom is in two parts, one all-welded box frame sliding within the other. A single long ram varies the boom length from 19 to 31 ft., under load and under any position of the boom. The boom is raised and lowered by two rams and cables acting on the lower or seat end, not through the tip of the boom as is customary practice.

The ⅝-in. load line is handled by two vertical rams at the back of the top frame operating through a series of sheaves—a reverse block-and-falls. Speed of the hoist line is 20 ft. per min.

The upper frame revolves at 3 rpm. around a king pin on four rollers. Swinging is accomplished by two rams acting on cables wrapped in opposite directions around a non-revolving horizontal spool fixed to the top of the king pin.

Another feature is a set of hydraulic controls mounted on the top of the



truck cab for running and steering the truck, so the operator does not have to climb down into the cab to move the truck. The crane is all-welded, fabricated completely from plate, shapes and pipe without a single casting.

Roy Billings is the inventor and will manufacture the crane under the name of *Milwaukee Hydraulic, Inc., 1645 So. 83rd St., Milwaukee, Wis.* General distribution will be through the *Milwaukee Truck Crane Co.* organized by *Paul Cole*, with offices at *30 No. La Salle St., Chicago, Ill.* Mr. Billings is now perfecting a hydraulic-operated clamshell for use on the single load line, and also has other attachments in process of development.

• • •

Light-Weight Reel

A new light-weight reel, "Retract-O-Reel", for supporting portable tools and air and electrical devices up to 10 lbs., has an adjustable cable clamp to hold the tool in easy reach. A solid cast, streamlined housing keeps out dust.—*Appleton Electric Co., 1701-1729 Wellington Ave., Chicago, Ill.*

DIGGING INTO A 3 BILLION DOLLAR MARKET

Cold facts about Blue Brutes will prove to you they're your best bet for post-war building . . . and cold facts on post-war buying intentions prove your market will be there:

A recent survey shows more than $3,000,000,000 has been budgeted for post-war construction plans, underway or completed today.

To back your bid check these features of Blue Brute Compressors against any other brand.

Feather Valves*, simplest and most efficient, soothe maintenance headaches, lessen repairs and delays.

*Reg. U. S. Pat. Off.

Full force feed lubrication throughout engine and compressor.

3-point Suspension "cradles" both engine and compressor in one integral housing, cushioning shocks and vibration.

Check all their strong points. Then take your choice of models . . . truck-mounted, two or four-wheel spring trailer and skid-mounted . . . Diesel, gasoline or electric driven . . . and team them up with Blue Brute air tools for best results.

Ask your nearest Worthington Representative listed on page **88** what models of compressors and air tools best fit your needs.

PC4-17A

Behind the Fighting Fronts with

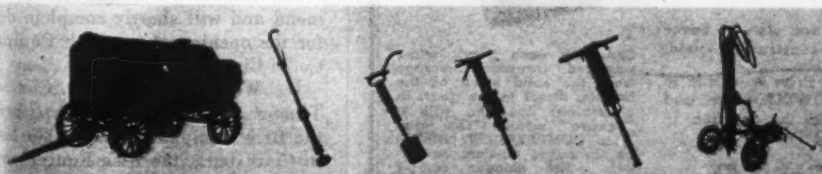
BLUE BRUTES

On jungle roads and airports 'round the world . . . on Pacific Islands . . . on bomb-blasted roads speeding U. S. Armies toward victory, Blue Brutes are hard at work today . . . and in hundreds of factories, Navy Yards, air bases . . . on vital supply lines behind the fighting fronts.**

**Blue Brute Compressors and Air Tools are painted olive drab for the Army, battleship gray for the Navy.

Get more WORTH *from air with* WORTHINGTON

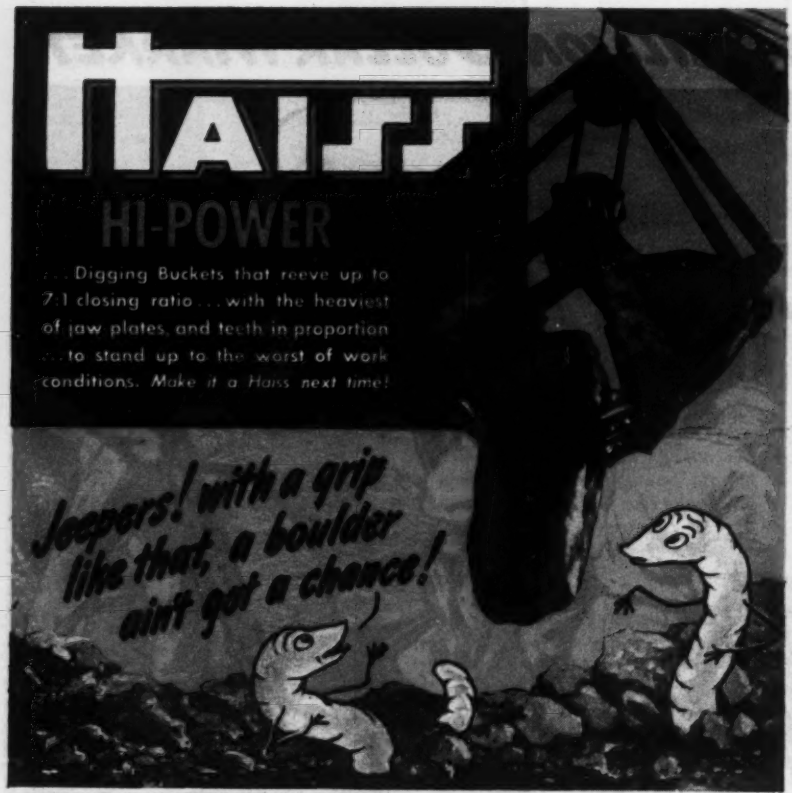
BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTH ALWAYS THE HOME WORTHINGTON

Worthington Pump and Machinery Corporation Construction Equipment Division, Holyoke, Massachusetts

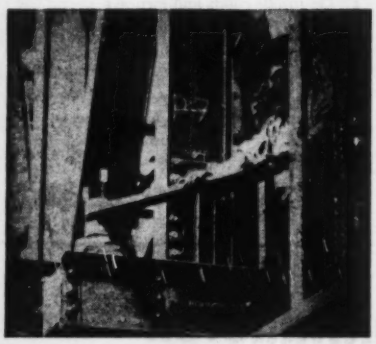

HAISS
HI-POWER
...Digging Buckets that reeve up to 7:1 closing ratio...with the heaviest of jaw plates, and teeth in proportion ...to stand up to the worst of work conditions. Make it a Haiss next time!
Jeepers! with a grip like that, a boulder ain't got a chance!

GEORGE HAISS MANUFACTURING CO., INC., 140th St. & Rider Ave., New York 51, N.Y.

Bucket agencies throughout the country. Write, wire for prices, delivery or catalogs.

Bridge Constructors Depend Upon LOWELL

Reversible Ratchet WRENCHES



For running up nuts on anchor bolts and connections, bridgemen need wrenches that will work fast and SAFELY.

The LOWELL "Steel Socket" Bridge Builders' Wrenches—with their positive guarantee that handles will not break—meet the tough requirements of big bridge jobs.

Built in a wide range of types and sizes to cover many needs of the engineering-construction field.

Have patience with your dealer if he is unable to furnish all of the NUMEROUS LOWELL types and sizes, because we are engaged, for the duration, in supplying the needs of our Armed Forces.

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear, in a straight line and with a "square" contact. The pawl is in COMPRESSION ONLY—no shear, no tension, no torsion. The shipper carries NONE of the load. This strong construction insures steady service.

LOWELL WRENCH CO.

1869 WORCESTER, MASS., U.S.A. 1943

Manufacturers' Activities

THE WATSON-STILLMAN CO., Roselle, N. J., has appointed John Thomas Gillespie, Jr., manager of export sales. During the past 2½ years, Mr. Gillespie has been with the shipbuilding division of the War Production Board as chief of staff branch, and previously with the Office of Price Administration contract distribution division as chief, liaison section with U. S. Maritime Commission, on a leave of absence from the Air Reduction Co., Inc., New York City.

Prior to taking up his duties with the Government, Mr. Gillespie was assistant to president of Wilson Welder & Metals Co., subsidiary of Air Reduction Co. His export experience was gained through several years' service with L. C. Gillespie & Sons, dealing with the export and import of raw materials.

ENGINEERING EQUIPMENT CO. now represents Yeomans Brothers Co. in the Cincinnati area, enlarged to include Dearborn County in Indiana and the northern tier of Kentucky counties facing southwestern Ohio.

F. L. Holliday heads the firm, which will represent the sales of all Yeomans products, including pumps and compressor and sewage treatment equipment. Holliday is an experienced pump man, having represented Worthington Pump & Machinery Co.

FROM THE OHIO RIVER to tidewater Virginia is the territory to be served by the expanded and newly named Rish Equipment Co., distributors of contractors' and industrial supplies. Previously located under other corporate names in Charleston and Clarksburg, West Va., and in Roanoke, Va., the company recently announced a location in Richmond and will shortly complete details for the opening of the Rish Equipment Co. of Cincinnati.

In West Virginia the Charleston Tractor and Equipment Corp. became the Rish Equipment Co. of Charleston; in Clarksburg, the Rish Equipment Co. of Clarksburg. The Roanoke Tractor & Equipment Corp. became the Rish Equipment Co. of Roanoke, and the new

...pany, the Rish Equipment Co. of ...chmond.

Two well known equipment men who ...ll play a prominent part in directing ... activities of the enlarged company ...re H. D. Anderson, and W. H. McIl...ny. Anderson is vice president and ...eral manager, with offices at Charles... McIlhany is general sales manager, ...th offices at Roanoke.

H. K. Porter Co., Inc., of Pittsburgh, ..., has appointed Victor Failmezger, ...eviously appli...ation and field ...gineer, as sales ...anager of its ...bsidiary, Quim...y Pump Co., of ...ewark and New ...runswick, N. J. During the past ...ear, Mr. Failmez...er has repre...ented the Porter ...o. and its subsidiaries in Western ...ennsylvania, West Virginia, and east...rn Ohio. He is a graduate of Stevens ...stitute of Technology. He was asso...iated with Westinghouse Electric & ...fg. Co., and Worthington Pump Co. ...n sales and application engineering in ...he 15 years prior to joining the Porter ...o.

Clyde Iron Works, Inc., Duluth, Minn., has been purchased by the Barium Steel Co. of Canton, Ohio, for $1,400,000. Joseph Sisto is chairman of the board of both organizations and Rudolph Everstadt is president of Clyde Iron Works. The Clyde organization will continue to build hoists, derricks, whirleys, car pullers and logging machinery.

Carver Pump Co., Muscatine, Ia., has appointed John J. O'Leary to represent it in the central states, and he has opened a branch office at 201 N. Wells St., Chicago. Mr. O'Leary was with the Independent Pneumatic Tool Co., Chicago, in a similar capacity for the last eight years.

Three new Carver distributors are announced—the Acme Contractors Machinery & Equipment Co., Inc., 4221 W. Harrison St., Chicago; the H. B. Faith Equipment Co., 2601 Huffman Blvd., Rockford, Ill., and Central Supply Co., Danville, Ky.

The Koehring Co., manufacturer of heavy construction equipment, of Milwaukee, Wis., has opened a service warehouse in Sacramento, Calif., where parts for all the company's products will be available to customers in eleven western states. The line includes power shovels, concrete mixers, earth moving equipment, etc.

Welded box sections give you extra strength without extra weight
...another reason why
HEIL Hydraulic Bulldozers and Trailbuilders
stand up dependably ...and take the tough jobs without wavering

Heil engineers and fabricators have pioneered the modern practice of replacing heavy members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays. The advanced design of Heil equipment assures you of more speed . . . greater flexibility . . . and ability to push through when the going is tough. Because they're tailormade to Cletrac Tractors, you get full visibility for safe, efficient handling.

The Trailbuilder blade is easily angled to right or left for side-casting new cuts. Bulldozer blade takes rocks and stumps without changing pace.

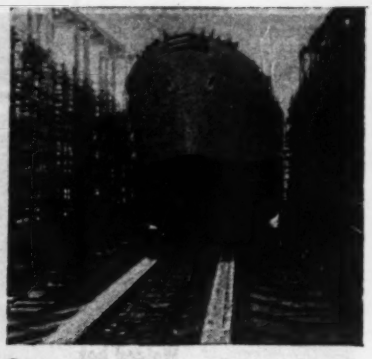
The Heil hydraulic system comes close to a perfect leak-proof unit—stays in adjustment and gives a minimum of trouble.

For full loads and more yardage per day and per year — at lower cost — use Heil Earth-moving equipment.

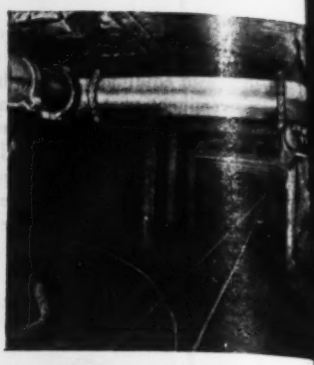
Write for bulletins.

R-24

1. Speedy Victaulic Couplings for Invasion Pipelines in Italy, France, the Pacific.

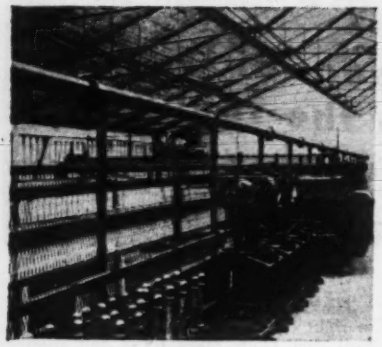


2. Flexible Victaulic Couplings for America's "bridge of ships."

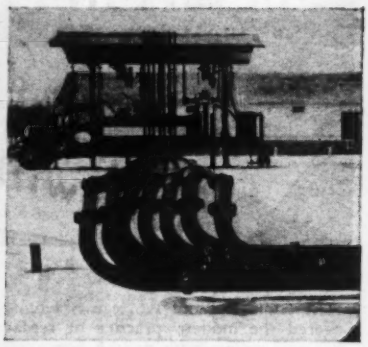


3. Self-aligning Victaulic Couplings for America's all-important mines!

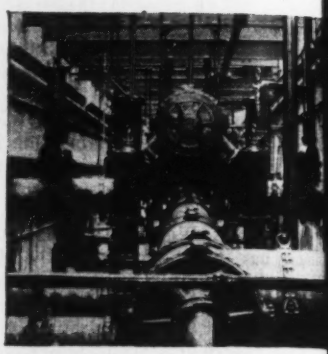
A BUSY YEAR...



4. Dependable, mechanically locked Victaulic Couplings that save man-hours for America's War Industry.

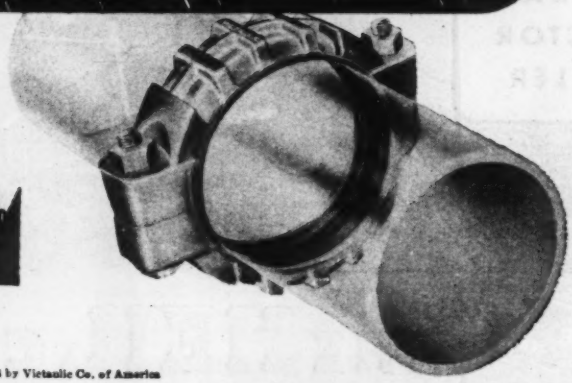


5. Proven, leak-tight Victaulic Couplings continuing more than a quarter century of service for America's Oil Industry.



6. Easily installed Victaulic Couplings for America's essential Municipal Works.

A BUSY FUTURE...



The very features which have made Victaulic Couplings indispensable in War... make them vital in reconversion, vital to the years of peace-time business ahead. Our couplings and Victaulic Full Flow Fittings will be available from the word "GO." For detailed information write VICTAULIC COMPANY OF AMERICA, 30 Rockefeller Plaza, New York 20, N. Y. *Other offices:* Victaulic Inc., 727 West 7th St., Los Angeles 14, California; Victaulic Co. of Canada, Ltd., 200 Bay Street, Toronto.

VICTAULIC

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SELF-ALIGNING PIPE COUPLINGS AND FULL-FLOW FITTINGS

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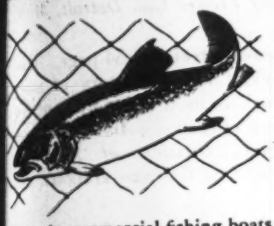
OIL MINING MARINE MUNICIPAL INDUSTRIAL

the "mining" of petroleum, as in
e mining of many other ores and
production of aggregates, Cum-
Dependable Diesels play a vital
. They power drilling rigs, trucks,
wels, dredges and many other
es of equipment . . . have estab-
ed an enviable record for reli-
ble, low-cost performance on
e toughest 24-hour-a-day jobs.



America's commercial fishing boats
re bringing in record catches to
eet record war-time requirements
r fish and fish by-products. Many
f these boats are Cummins Diesel-
owered because fishermen every-
here know that the best assur-
nce of being "first out and first
ack" is a Cummins Marine Diesel.

Basic in war and basic in peace is the vast logging industry of the Northwest. Here, the performance of Cummins Dependable Diesels in yarders, loaders, trucks and tugs explains why Cummins Diesel power is known among loggers as "the power behind CHEAP LOGS."

In agriculture and its many allied industries, Cummins Diesel power has innumerable applications. It is widely used in the West for irrigation purposes . . . in cotton gins, flour and feed mills, ice plants, dairies and many other places where its economy and dependability have been instrumental in increasing production and also decreasing costs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets • locomotive models.

Backbone of every Basic Industry

In the "mother" or basic industries which produce the raw materials—agriculture, mining, commercial fishing and logging—and in the countless allied industries that play a part in the conversion of raw material into finished product, the development of the high speed diesel in 1932 went a long way toward changing modern concepts of power.

This diesel was a Cummins Diesel. Once and for all it struck away the shackles of excessive weight and size which had so long limited the use of diesel power. Once and for all it proved that diesel power could be applied to virtually any heavy-duty job and do that job—cheaper, faster, longer.

Since 1932, continued refinements in every phase of design, construction and material specification have produced still further improvements in the Cummins Diesel's operating economy . . . still further reductions in its weight and dimensions per horsepower. That's why operators and builders of all types of powered equipment—automotive, industrial and marine—have turned to Cummins for the dependable, low-cost power which is the backbone of industry. CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

Manufacturers' Publications

Tire Handbook—Especially valuable for those using commercial tires—truck operators, excavating and other contractors—in this period of shortages is this operator's handbook. It provides vital data about tires, rims and wheels; recommends procedure for proper care and maintenance.—*The B. F. Goodrich Co., Akron, Ohio.*

Heat-resisting Castings—A 4-page bulletin illustrates typical applications of various special heat resisting castings.—*Meehanite Research Institute of America, Inc., Pershing Square Building, New Rochelle, N. Y.*

Cleaning Ball Bearings—A folder describes a machine for cleaning ball bearings and gives price and delivery information.—*L & R Manufacturing Co., 577 Elm Street, Arlington, N. J.*

Water Technology—A bulletin gives details of construction and operation of the Dorrco Hydro-Treator and contains several pages of graphs, tables and formulas useful to water technologists. The Hydro-Treator is a self-contained water treatment unit which combines the three well established steps of water treatment—flocculation, thickening and clarification—in one unit. These steps are performed in sequence in three separate zones extending from the bottom to the top of the unit.—*The Dorr Co., Engineers, 570 Lexington Ave., New York 22, N. Y.*

Table of Allowable Pressures—A 20-page booklet gives allowable working pressures for welding fittings in five classes of piping—power, oil, district heating, gas and air, and refrigeration. Fourteen convenient tables list allowable pressures at the indicated temperatures for any size and weight fitting. All tabulations are made in accordance with the Code for Pressure Piping A.S.A.—*Tube Turns, Inc., Louisville, Ky.*

Worm Gear Reducing Units—A 4-page illustrated bulletin contains a concise description of new fan-cooled worm gear reduction units. A large illustration in the center spread shows how the high velocity air stream is held on a directed course by the double wall housing, how the heat-dissipating surface is nearly doubled by integrally cast fins on the outer wall of the housing. It is pointed out that because of the more effective removal of heat the unit delivers up to twice the horsepower capacity obtainable from standard type worm reducers of equal size, when operated at the usual motor speeds.—*The Cleveland Worm and Gear Co., Cleveland, Ohio.*

Elevating End Gate—It is claimed that time, labor and money are saved by the Fruehauf combination elevator and end gate described in this folder. It uses engine power instead of brawn to load and unload trucks and trailers. —*Fruehauf Trailer Co., Detroit, Mich.*

Manganese Steel—A 54-page, illustrated booklet tells the story of manganese steel as used in equipment for all dredging purposes.—*American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill.*

Fiber Pipe—Extensive literature is available describing in detail fiber pipe used for various industrial and domestic purposes. For the product it is claimed that it is non-metallic, non-corrosive, light and economical for non-pressure uses.—*The Fibre Conduit Co., Orangeburg, N. Y.*

The Rud-o-Matic Combination Magnet Reel and Tagline is a radical departure from the usual reel, something which is brand new and which no one else can offer. It is operated on a string principle for tension. Tagline cable is attached to magnet with sufficient tension to steady, then electric cable is fastened to connections on magnet, leaving same a little slack. As both drums revolve together, electric cable always maintains the degree of slackness originally set. This feature eliminates any possibility of electric cable being pulled apart or jerked loose from the connections, thus insuring a long life for it. Most of the crane manufacturers have adopted Rud-o-Matics as standard equipment.

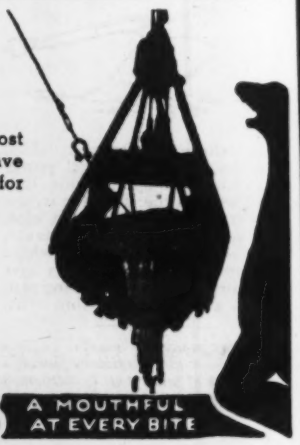
McCAFFREY-RUDDOCK TAGLINE CORP.
2121 East 25th Street Los Angeles 11, California

TRACTOR & MCHRY. CO. Atlanta, Ga. A. H. COX & CO. Seattle FORSYTHE EQUIP. CO. Long Island City, N. Y. COMLEY EQUIP. CO. Philadelphia, Pa. W. E. PHILLIPS Detroit, Mich. L. L. HANSON Chicago, Ill. OWEN BUCKET CO., LTD. Berkeley, Calif.

Water Seasoned AS THE "MARS"

Designed for special service and tested under most gruelling conditions Owen Dredging Buckets have proved to be uncommonly efficient and durable for difficult under-water operations.

THE OWEN BUCKET CO.
6019 Breakwater Ave., Cleveland, O.
Branches: NEW YORK - CHICAGO - PHILADELPHIA - BERKELEY, CAL.



OWEN BUCKETS A MOUTHFUL AT EVERY BITE

BRUTE POWER

● Good governing of internal combustion engines in construction, mining or other industrial applications, promotes greater operating efficiency and longer, economical service—two things dear to the operator's heart.

And that's the reason Pierce Governors, as original equipment on many of the world's leading engines, and replacements on many others, are setting the pace in every field where internal combustion power is used.

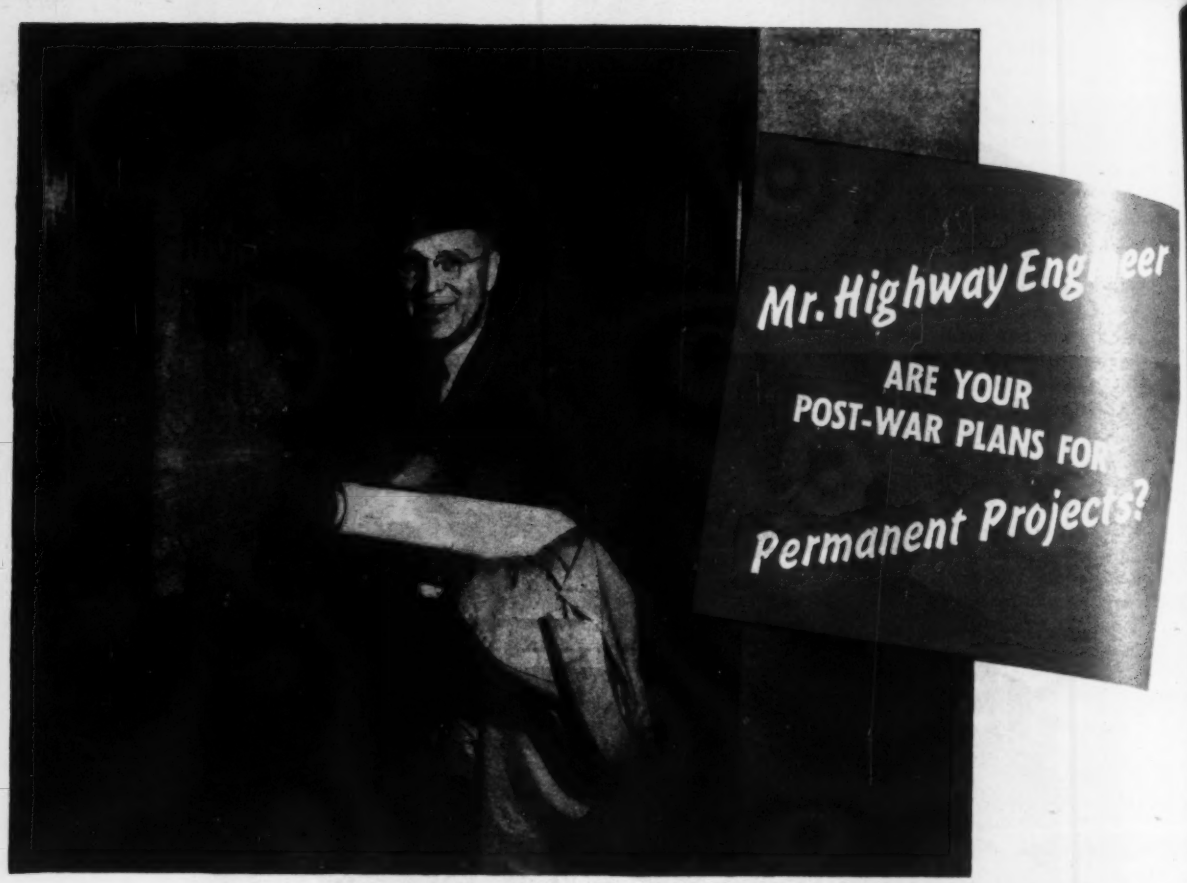
Pierce governing is good governing—mechanically dependable and sensitively responsive through the time-proved flyball principle. And in service, Pierce Governors often outlast the engines, themselves.

Pierce Governors for gas, gasoline and diesel engines are available in more than 2,000 models. If your engines are not now Pierce-governed, write for full information and the new Pierce catalog. And specify Pierce on the new engines you buy.

THE PIERCE GOVERNOR COMPANY, INC. • 1647 OHIO AVENUE • ANDERSON, INDIANA

Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes

PIERCE GOVERNORS



Highway Engineers who are alert to the changing times have already gone far in definite plans for future construction. When men, materials and money are once more available, they will be ready with plans for useful, practical improvements. These engineers will see to it that the public gets value received for its taxes.

Perhaps you have not been able to begin planning a comprehensive program for yourself. Maybe you're short of manpower. You don't have to do the whole job at once, you know. Why not start with your small bridges, for instance?

You can inspect and rate your bridges one by one. Make plans, figure estimates as you have time. And, if you plan to use Toncan Iron Sectional Plate Pipe and Arches, you will be planning for long-lasting bridges, constructed most readily and economically. You will be giving the tax-payer the most for his money in permanent highway improvements.

Make use of "Planning Small Bridges for Post-War Construction" which will help you get started with plans for your small bridges. Be sure you're ready when the time comes with completely worked out plans for long-lasting improvements.

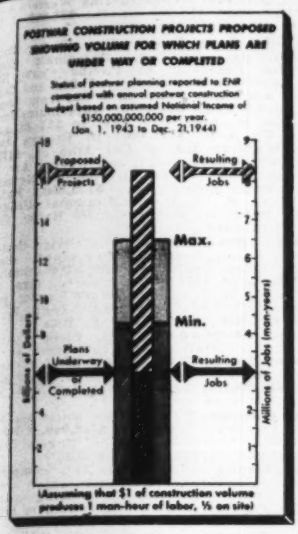
THIS NEW BOOKLET...

"Planning Small Bridges for Post-War Construction"—will make it easy for you to do just that. For instance, it will help you to choose between sectional plate pipe and arches—help you to design abutments, head walls and wing walls. Write for this booklet and helpful data forms today.

TONCAN CULVERT MANUFACTURERS ASSOCIATION

REPUBLIC BUILDING · CLEVELAND 1, OHIO

POSTWAR PROJECTS


POSTWAR CONSTRUCTION PROJECTS PROPOSED SHOWING VOLUME FOR WHICH PLANS ARE UNDER WAY OR COMPLETED
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to Dec., 21,1944)
Proposed Projects
Resulting Jobs
Max.
Min.
Plans Underway or Completed
Resulting Jobs
Millions of Dollars
Millions of Jobs (man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ⅓ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943, at they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume, and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

Ky., Owensboro—City, City Hall, E. Smith, supt. Pub. Utilities, exten. distr. sys., of 6 and 8 in. c.i. watermains, and install fire hydrants. **$70,000.**

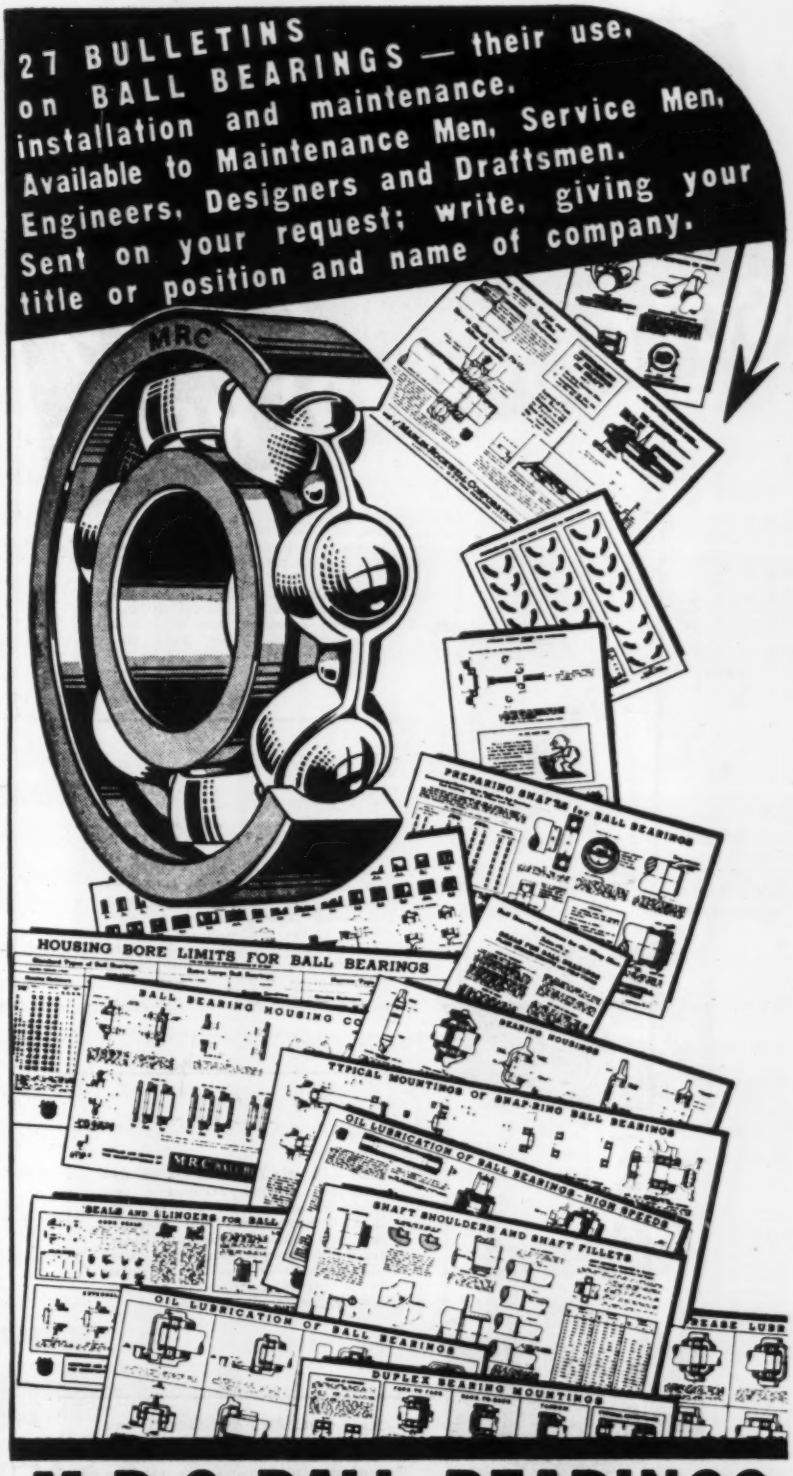
Va., Richmond—City, G. Bowers, dir. Dpt. P. Wks., City Hall, 2 elevated water tanks, one on southside and other on northside. **$255,000.** CD 10/7/43—ENR 10/14/43.

PLANS UNDER WAY

Ala., Anniston—City, City Hall, exten. watermains. **$165,000.** Ladd Eng. Co., 209 Park Bldg., Mobile, consult. engr.

Ark., Little Rock — Little Rock Water Works Sys., Robinson Auditorium, L. A. Jackson, mgr., plans under way extensive WW sys. imprvs. **$200,000.**

★**Calif., Glendale**—City, P. Diederich, supt. Pub. Serv., 119 N. Glendale Ave., plans completed 7½ m.g. rein.-con. reservoir with flat slab roof, and 9,500 lin. ft. 16 and 20 in. c.i. water pipe, 1290 level, **$147,000**; 5,500 lin. ft. 8- to 20-in. c.i. watermain, Brand Blvd. and Bway., **$65,000**; plans 50% completed Melwood 968 level 1,800,000 gal. rein.-con. reservoir with pump. plant, **$50,000**; preliminary plans reconstructing main pump. plant with aerator and settling basin capacity of 21 m.g. daily, **$180,000**; 2½ m.g. rein.-con. reservoir and 7,000 lin. ft. 12 and 16 in. c.i. water pipe, 1290 level, **$106,000**; 4,500 lin. ft. 24 in. c.i. watermain in Glenoaks Blvd., Verduga Rd. to Chevy Chase Dr., **$65,000**; replacing 6,200 lin. ft. 12 in. c.i. watermains with 20 in. c.i. watermains in E. Glenoaks, **$61,500**; 50 m.g. rein.-con. reservoir with flat slab roof and incidental pipe lines, 720 level, **$670,200**; 7 m.g. rein.-con. reservoir, 968 level, **$129,000**; replacing service and local supply mains due to depreciation or inadequate capacity, **$300,000**; replacing mains to 968 level reservoirs due to inade-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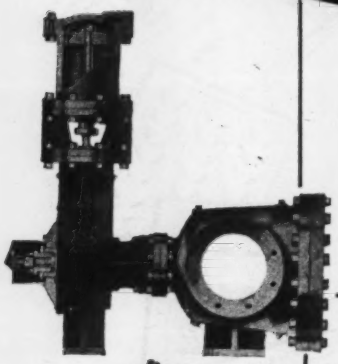

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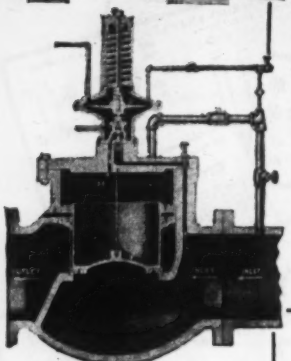

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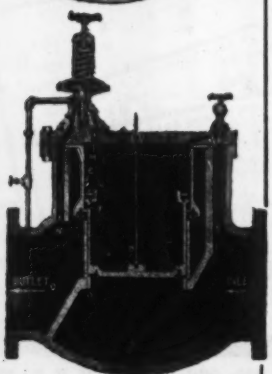

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POSTWAR PROJECTS (Cont.) quate capacity, **$70,600**; repla[illegible] mains to 724 level reservoirs due to in[illegible]dequate capacity, **$76,200**; plans addnl. w[illegible]termains required due to normal deve[illegible]opment and expan., **$375,000**; reconstructing [illegible]estern Ave. reservoir roof, 128,000 sq. ft., **$32,000**. J. C. Albers, City Hall, city engr.

★**Calif., Long Beach**—City Water Dpt., Municipal Utilities, wat[illegible]ain from Alamitos Reservoir at Pacific Coast Hy. and Reservoir Dr. West to 7 St., and California Ave., also main in 8 St. from Loma to Ximono Aves. **$265,700**; watermains from Anaheim St. and Pico Ave. to 223 St. and Sante Fe Ave., **$174,100**; in Orange Ave. from Wardlow Rd. to Del Amo St., **$111,500**/ from Wardlow Rd. and Cherry Ave. to Citizens Booster pump. plant, Newport Ave. and Spring St., **$158,200**. Funds available. B. Harmon, Municipal Utilities Bldg., hydraulic engr. G. E. Baker, City Hall, city engr.

Calif., San Diego—City, Civic Center water development, filter plant, distr. mains; plans completed dam strengthening **$75,000**. Land rights not cleared, legal obstacles to be overcome, financing not provided. F. D. Pyle, hydraulic engr. F. A. Rhodes, Civic Center, Dir. P. Wks.

Conn., Hartford — City Flood Control Comm., City Hall, plans completed by H. Hilliard Smith, 1789 Albany Ave., 4 pump. station units, brownstone, Hudson and Elm Sts. **$75,000**. Financing not provided. CD 4/7—ENR 4/20.

Ga., Cochran—Town, exten. water sys. and new treatment plant. **$136,000**. Funds available. Smith & Gillespie, Rogers Bldg., Jacksonville 1, Fla., consult. engrs.

Ga., Vienna—Town, plans 80% completed exten. water distr. sys. and water treatment plant. **$80,000**. Financing partly completed. Smith & Gillespie, Rogers Bldg., Jacksonville 1, Fla., consult. engrs.

Ill., Polo—City, City Hall, watermain exten. **$25,000**. C. K. Willett, City National Bank Bldg., 317 N. Galena St., Dixon, consult. engr.

Ia., Keokuk—City, City Hall, plans 10% completed 8 in. c.i. watermain exten. and 8- to 10-in. vitr. clay sanitary sewer, Boulevard Rd., and sewer exten. in various parts of city, **$57,400**. Financing not provided. C. J. Nelson, City Hall, city engr.

Kan., Pittsburg — City, City Hall, plans addnl. reservoir, plans completed boilers for pumping, **$150,000**. $85,000 available. Black & Veatch, 1706 Bway., Kansas City, Mo., consult. engr. C. M. Cooper, City Hall, city engr. CD 9/12—ENR 9/21.

★**Kan., Russell**—City, City Hall, water supply and WW imprvs. **$750,000**. Wilson & Co., Public Utility Bldg., Salina, consult. engrs. J. F. Branson, P. O. Box 508, city engr. CD 9/7—ENR 9/21.

Kan., Topeka—City, L. B. Smith, water comr., City Hall, pre-settling basin, raw water pipeline revisions, modifications present final settling basins, and hydraulic modifications. **$144,580**. Black & Veatch 1706 Bway., Kansas City, Mo., consult. engrs.

Kan., Topeka—City Water Dpt., 215 E. 7 St., plans 50% completed chemical storage wells north of river. **$185,000**. Black & Veatch, 1706 Bway., Kansas City, Mo., consult. engrs. C. Door Pelton, Water Dpt. City Hall, engr. W. E. Baldry, City Hall, city engr. CD 11/16—ENR 11/30, under Public Buildings.

Mass., Billerica—Town Bd., Selectmen, Town Hall, 1 m.g. water sys. storage facilities, **$45,000**. Land rights not cleared. T. Camp, 6 Beacon St., Boston, consult engr. CD 5/9—ENR 5/18.

Mass., Pittsfield—City Water Dpt., City Hall, preliminary survey completed water supply sys. Over **$50,000**. Financing not provided. Metcalf & Eddy, 1300 Statler Bldg., Boston, consult. engrs. CD 3/16—ENR 4/6.

N. J., Collingswood—Borough of Collingswood, Borough Hall, aerator and settling basin and aprox. 2 mi. 8 in. c.i. watermains, **$41,200**. J. H. Osler, Jr., 717 Belmont Ave., engr.

N. Y., Dansville—Village, plans under way repairing storage dam, stop leak, test borings to be made. **$50,000**. Wm. S. Lozier Co., 10 Gibbs St., Rochester, Zone 4, consult engr. CD 10/12—ENR 11/2.

O., Bellevue—City, R. L. Wagar, dir. P. Serv., Municipal Bldg., plans under way imprv. WW sys. **$175,000**. Bond issue approved. CD 9/1/43—ENR 9/9/43.

★**O., Cincinnati** — City, City Hall, new pump. station with feedline into present sys., and booster station, in California, east of here. **$8,000,000**. C. Eberling, City Hall, city engr.

READY FOR BIDS

Calif., Alhambra—City, City Hall, plans completed increasing capacity of city water supply storage by 6,700,000 gal., requiring 2 steel tanks, one 132 ft. diam., 27 ft. deep and other 90 ft. diam., 27 ft. deep. **$130,000**. J. Clay, City Water Dpt., engr.

SEWERS, WASTE-DISPOSAL

PROPOSED WORK

Ind., Pendleton—Town Bd., sewage treatment plant, $75,000.

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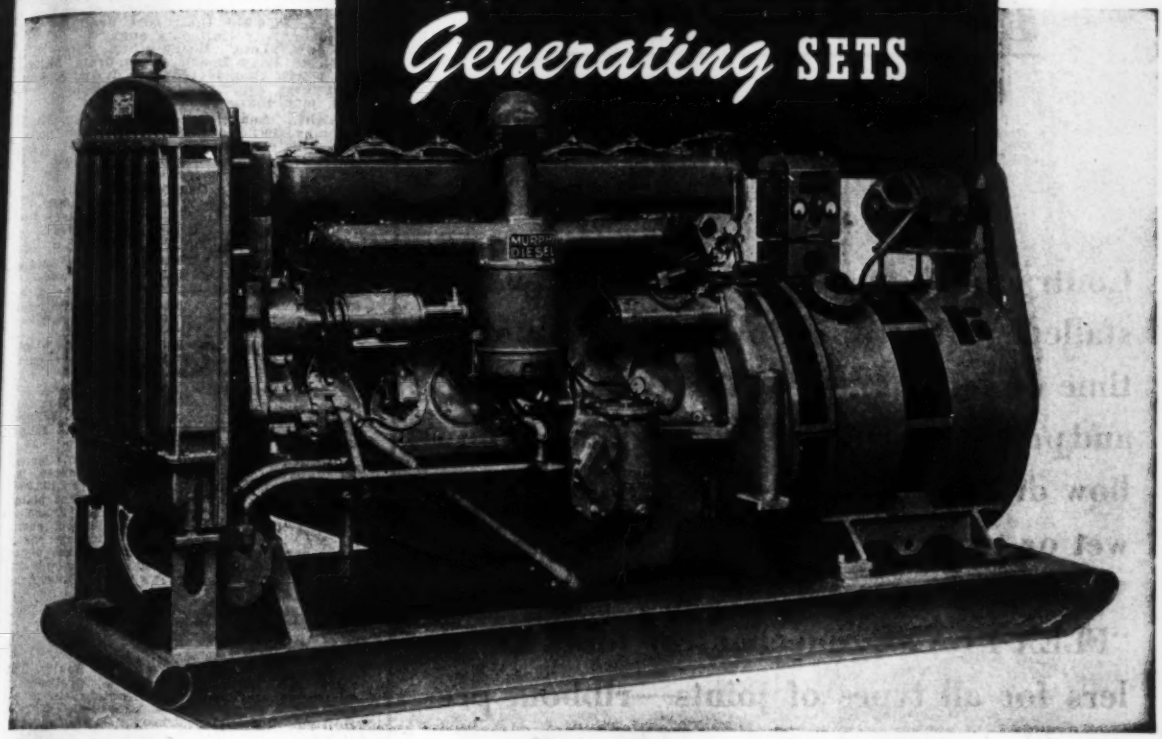

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POSTWAR PROJECTS (Cont'd.)

N. S., Antigonish—Municipality, H. R. Chisholm, clk., City Hall, municipal bldg., housing all civic departments, committees, etc. **$150,000.**

PLANS UNDER WAY

★**Ala., Anniston**—City, City Hall, plans 75% completed concrete storm sewer, **$750,000**; plans 5% completed sanitary sewers, **$120,000.** Financing not provided. Ladd Eng. Co., 209 Park Bldg., Mobile, consult. engr.

★**Calif., Long Beach**—City, City Hall, plans 25% completed storm drain Pump. Dist. 3, **$850,000** (half cost available). G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, North Long Beach storm drain, **$1,450,000**; North Boundary storm drain, **$550,000** (half cost available). G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, plans 10% completed Northeast storm drain district, **$1,750,000**, (half of funds available). G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, sewage disposal plant, **$3,107,000.** Financing not provided. G. E. Baker, City Hall, city engr. CD 5/4—ENR 5/18.

Calif., Long Beach—City, City Hall, rubbish incinerator, **$320,000.** ($112,266 available). G. E. Baker, City Hall, city engr.

Calif., Long Beach—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans 25% completed storm drainage sys., **$100,000**; plans 10% completed sewerage sys. incl. pump. station, **$100,000.** Funds available. R. R. Shoemaker, ch. harbor engr. G. E. Baker, City Hall, city engr.

Calif., Redwood City—City, City Hall, plans under way, sewage treatment plant, sewers, **$300,000**; city wide drainage, **$65,000.** Bonds voted. R. J. Clarke, City Hall, acting city engr. CD 11/16—ENR 11/30.

★**Calif., San Diego**—City, Civic Center, plans under way 9 projects, exten. interceptor and trunk line sewers, **$1,133,000.** Funds available; enlarging treatment plant, **$800,000.** Land right not cleared, financing not provided. G. R. Hayler, assoc. engr., H. M. Cole, Civic Center, sanitary engr.; plans completed 1 storm drain, plans under way, 2 storm drains, **$88,300.** Financing not provided. City Engineer's Staff, Civic Center, engr.

Conn., New Britain—City P. Wks. Dpt., City Hall, brick, concrete, steel refuse incinerator. **$250,000.** G. Malleur, City Hall, city engr.

Conn., Westport—Town, A. T. Scully, first selectman, 53 East State St., preliminary survey constructing refuse incinerator plant, **$100,000.** Financing not provided. Kels & Holroyd, 257 Bway., Troy, N. Y., consult. engrs.

Ga., Cochran—Town, plans completed general expan. sewerage sys., incl. new sewer treatment plant, **$200,000.** Financing partly completed. Smith & Gillespie, Rogers Bldg., Jacksonville, Fla., consult. engrs.

Ga., Vienna—Town, plans 80% completed general overhaul and expan. sewerage sys., incl. sewage treatment plant, **$250,000.** Financing partly ready. Smith & Gillespie, Rogers Bldg., Jacksonville, 1, Fla., consult. engrs.

★**Ind., Elkhart**—**Bd. P. Wks.**, C. H. Neale, chn., City Hall, **surveys** and recommendations, sewage treatment plant, exten., repairing sewerage sys. **$2,000,000.** Consoer, Townsend & Associates, 211 W. Wacker Dr., Chicago, Ill., consult. engrs. CD 7/14—ENR 7/27.

★**Ind., South Bend**—City, 218 N. Main St., plans 25% completed sewage treatment and interceptor sewer and exten. several sewers. **$6,000,000.** C. E. Williams, City Hall, city engr. CD 7/14—ENR 7/27.

Ia., Davenport—City, City Hall, vitr. clay or concrete storm sewers, **$300,000.** Consoer, Townsend & Associates, 211 N. Wacker Dr., Chicago, Ill., consult. engrs. R. C. Graham, City Hall, supt. constr. E. D. Stapp, city engr. CD 5/1—ENR 5/18.

Ia., Grundy Center—City, City Hall, plans 15% completed sewage treatment plant, outfall sewer, pump. station, sanitary lateral sewers. **$93,700.** Land rights not cleared. Stanley Engineering Co., Muscatine, consult. engrs. CD 12/8/43—ENR 12/16/43.

Kan., Atchison—City, City Hall, plans 50% completed 8 in. tile sewer in 2 sanitary districts, **$25,000.** Land rights not cleared. E. Hellener, City Hall, city engr. CD 8/31—ENR 9/21.

Kan., Hutchinson—City, City Hall, plans 5% completed clay sanitary sewers with pump. plant, concrete pipe and concrete box storm drains, **$200,000.** Financing not provided. A. R. Campbell, City Hall, city engr.

★**Kan., Olathe** — Johnson Co., Olathe, study being made complete sanitary sys. for suburban area. **$1,000,000.** Black & Veatch, 1706 Bway., Kansas City, Mo., consult. engrs.

Kan., Pittsburg—City, City Hall, plans under way addnl. vitr. clay sanitary sewers, and treatment plant, **$300,000.** Financing not provided. C. M. Cooper, City Hall, city engr.

Ky., Owensboro—City, City Hall, combined sewers, 6- to 21-in. vitr. pipe, 24- to 42-in. concrete pipe, 42- to 60-in. monolithic concrete pipe. **$80,000.** J. C. Keeley, City Hall, city engr.

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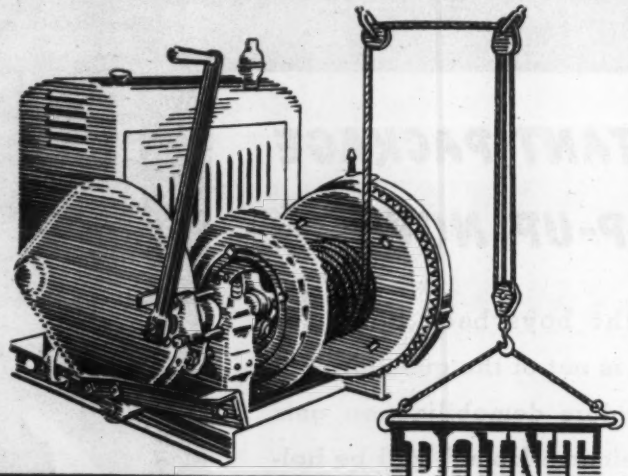

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POSTWAR PROJECTS (Cont'd.)

La., New Orleans—City, City Hall, plans 10% completed incinerator plant exten., incl. 6 ft. deep concrete-lined pit for refuse storage, etc. **$100,000.**

Minn., Canby—City, J. R. Guddal, clk., City Hall, sewage disposal plant, **$50,000-$100,000.** Toltz, King & Day, 1501 Pioneer Bldg., St. Paul, consult. engrs.

N. J., Collingswood—Borough of Collingswood, Borough Hall, reconstructing sewage treatment plant, new sludge digestion tank, sludge drying beds, aeration sys., pump and control house, enlarging present units, pump station about 1 mi. force main, 1 mi. relief sewers, separate sanitary sys., construct miscellaneous storm water drains, **$210,750,** garbage and refuse incinerator, **$16,200.** J. H. Osler, 717 Belmont Ave., engr.

N. J., New Brunswick—City, City Hall, plans 90% completed sewage treatment plant addn. **$180,000.** Land rights not cleared. E. Killam, 142 Maiden Lane, New York, N. Y., consult. engr. M. W. Taylor, City Hall, city engr.

★**N. J., Plainfield**—City, City Hall, plans 25% completed 20,000 lin. ft. 18- to 36-in. rein.-con. storm sewers, 7,000 lin. ft. 8x10 ft. and 1,600 lin. ft. 4x8 ft. rein.-con. box culvert, **$350,000;** plans 30% completed 16,600 lin ft. 15 and 24 in. vitr. clay sanitary relief sewers, appurtenances, **$250,000.** H. E. Hush, City Hall, city engr. CD 2/10—ENR 2/24.

N. Y., Hempstead—Village, 318 Fulton St., plans 75% completed storm drains, drainage structures, **$40,000.** L. S. Marshall, 318 Fulton St., engr. CD 7/6—ENR 7/27.

N. Y., Norwich—City, City Hall, preliminary plans completed sewer extens., sewage disposal plant, **$100,000.** H. W. Taylor, 11 Park Pl., New York, Zone 7, consult. engr. CD 6/21—ENR 6/29.

N. Y., Peekskill—City, City Hall, preliminary plans under way intercepting sewers, outfall service, syphon lines and sewage disposal plant, **$475,000** Metcalf & Eddy, Statler Bldg., Boston, Mass., consult. engrs. CD 4/20—ENR 5/4.

N. Y., Pulaski—Village, H. R. Franklin, mayor, Village Hall, plans under way sewerage sys. **$270,000.** Financing not provided. Barker & Wheeler, 36 State St., Albany, consult. engrs. CD 2/25—ENR 3/9.

N. Y., Sherburne—Town, plans completed sewer extens., sewer treatment plant, **$110,000.** Legal obstacles to be overcome, financing not provided. H. W. Taylor, 11 Park Pl., New York, Zone 7, engr. CD 1/10—ENR 1/27.

★**N. Y., Yonkers**—City, City Hall, Zone 2, plans completed vitr. and rein.-con. house and storm water sewer in Byrn Mawr Knolls, **$99,321,** Vredenburgh Ave. and laterals between Midland Ave. and Turner Sts. **$68,-260;** Sect. 1, Alta Vista Dr. and laterals between Troublesome Brook and Alpine Rd. **$66,928.** Land rights not cleared and financing not provided; plans 50% completed Sect. 1, Roxbury Dr. and laterals, **$88,584;** preliminary plans 50% completed Sect. 3, in Sunnybrook, **$170,000;** preliminary plans 40% completed Sect. 4, in Sunnybrook, **$170,-000;** preliminary plans 45% completed Sect. 2, in Sunnybrook, **$175,000;** preliminary plans 80% completed vitr. house sewer, Sect. 1, Sunnybrook, between Central Park Ave. and Rockledge Rd., **$150,000;** plans 90% completed c.i. and rein.-con. relief sewer in Ashton Rd., **$69,288;** plans 60% completed rein.-con. relief sewer in Riverdale Ave., Culver and Radford Sts., **$59,665.** N. P. Henderson, Bureau Engrg., City Hall, Zone 2, city engr. CD 6/21—ENR 6/29.

O., Elyria—City, I. D. Faxon, dir. Pub. Serv., City Hall, garbage disposal plant, **$50,000.** Havens & Emerson, Leader Bldg., Cleveland, consult. engrs.

Ore., Tillamook—City, City Hall, exten. sewerage sys. **$25,000.** U. E. Nelson, Railway Exchange Bldg., Portland, consult. engr.

★**Pa., Phila.**—City, City Hall, plans 50% completed rectification of Frankford Creek, incl. erecting 6 bridges, WE-25, **$3,-211,000.** J. Neeson, P. Wks. dir.

★**Pa., Phila.**—City, City Hall, J. Neeson, dir. P. Wks., plans 70% completed relief sewer exten., Pennsylvania Ave., WE-28 **$320,000;** Allegheny Ave., WE-29, **$676,000;** Rock Run, WE-30, **$1,020,000;** plans 60% completed Roxborough sewers, separate sys., WE-59-A, **$500,000;** Chestnut Hill sewers, separate sys., WE-60-A, **$500,000;** Thomas Ave. relief sewer exten., WE-27, **$1,092,000;** city wide reconstruction of old sewers, WE-372 to 516, **$3,100,000;** plans 50% completed Wingohocking storm relief sewer exten., WE-24, **$3,410,000.** CD 12/1/43—ENR 12/16/43.

Wis., Centuria—Village, Mrs. G. B. Noyes, clk., City Hall, sewage treatment plant, sewers, **$70,000.** Banister Engrg. Co., 490 N. Snelling Ave., St. Paul, Minn., consult. engrs.

BRIDGES

PROPOSED WORK

Kan., Ashland—Clark Co., Ashland, bridge across Cimarron River, **$30,000.**

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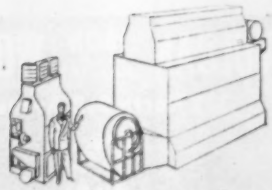

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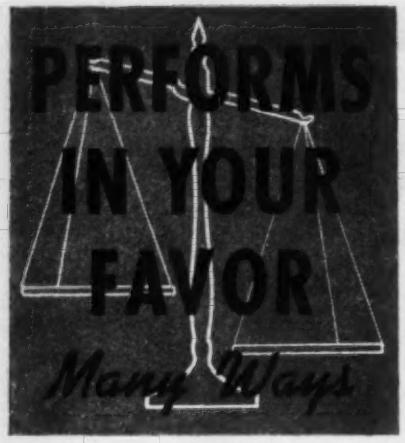

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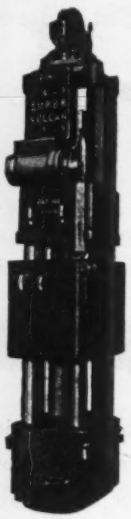

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POSTWAR PROJECTS (Cont'd.)

Ohio—State Hy. Dpt., Columbus, bridge across Beaver Creek on U. S. Route 30, west of Lisbon, Columbiana Co. **$250,000.**

PLANS UNDER WAY

Calif., Long Beach—City, City Hall, Anaheim Street Bridge. **$450,000.** Financing not provided. G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, plans underway Long Beach Blvd. Bridge. **$1,000,000;** Willow St. Bridge, **$450,000.** Bonds voted. G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, voted bonds, Marine Stadium Bridge. **$800,000.** G. E. Baker, City Hall, city engr.

Calif., Redwood City—City Hall, plans under way, concrete bridges on Valota Rd., Redwood Ave., Gordon, Hudson, Fay, Clinton, Sanphire, Topaz and Duane Sts. **$30,000.** Bonds voted. R. J. Clarke, City Hall, acting city engr. CD 11/16—**ENR 11/30.**

★**Calif., San Diego**—City, Civic Center, plans under way 5 rein.-con. bridges on major streets to be rebuilt. **$675,000.** Financing not provided. J. H. Kershaw, Civic Center, structural engr.

★**Ind., South Bend**—City, 218 N. Main St., 3 new bridges, replacing 1 bridge, **$600,000.** C. E. Williams, City Hall, city engr. CD 7/19—**ENR 7/27.**

Ia., Hampton—Franklin Co., Hampton, plans 5% completed concrete substructure, concrete bridges one 16 ft., two 18 ft., one 22 ft., four 24 ft., one 26 ft., one 28 ft., one 36 ft., one 48 ft. spans and one 60 ft., and one 80 ft. steel truss spans. **$14,800.** Iowa State Hy. Comn., Ames, consult. engrs. C. P. Rudisill, Hampton, co. engr.

Kan., Atchison—City, City Hall, plans under way overhead steel railroad crossing, **$200,000.** F. Finney, N. E. Bldg., Topeka, consult. engr.

N. J., Flemington—Bd. Freeholders, Hunterdon Co., Flemington, plans 20% completed two 50 ft., concrete incased I-Beam bridge, approaches, Kingwood Twp. **$25,000.** Land rights not cleared and financing not provided. E. S. Disbrow, **Flemington, co. engr.**

Wisconsin—Manitowoc Co. Hy. Comn., Manitowoc, 10 year bridge and road program 2nd year, Quarry Bridge, Co. Trunk J, **$45,000;** Lemke Bridge, Co. Trunk A, **$20,000;** Rezba Bridge, Co. Trunk Y, **$20,000;** 3rd year, Taus Bridge Moribel overhead and approaches, **$70,000;** 5th year, Millhorne Bridge, Co. Trunk E, **$25,000;** 6th year, Meyer Bridge, **$3,000;** Chupita Bridge, Hy. NN, **$4,000;** Fisch Mills Bridge, Hy. BB, **$15,000;** 9th year, Bradley Bridge, Hy. B. **$14,000;** Miller Bridge, **$8,000.** E. T. Berkedal, Manitowoc, engr.

Wis., Racine—Comrs. Racine Co., Racine, bridge over Root River on County Trunk Hy. G. **$50,000.** E. F. Fischer, engr.

READY FOR BIDS

Calif., Long Beach—City, City Hall, plans completed, Artesia St. Bridge. **$350,000.** Funds available. G. E. Baker, City Hall, city engr.

N. Y., Black River Village—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$200,000.** CD 12/20/43—ENR 1/13/44.

★**N. Y., Buffalo**—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed grade crossing elimination at The Terrace, Case No. 5472, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$3,080,000.** CD 12/15/43—ENR 12/23/43.

N. Y., Fultonville-Fonda—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York, N. Y. **$175,000.** CD 12/20—ENR 1/13.

N. Y., Manchester-Victor—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for Lehigh Valley R. R. Co., R. E. Patterson, ch. engr., 425 Brighton St. Bethlehem, Pa. **$200,000.** CD 12/20—**ENR 12/23.**

N. Y., Mindenville—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed lengthening Bridge E-28 on Barge Canal. **$25,000.** CD 12/31/43—ENR 1/13/44.

N. Y., Oswego—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed raising Bridge 0-14, on Barge Canal. **$70,000.** CD 12/30—ENR 1/13.

N. Y., Oswego—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for New York, Ontario & Western Ry. Co., F. J. Meyer, ch. engr., Middletown. **$100,000.** CD 12/20—ENR 12/23.

N. Y., Pavilion-Griegsville—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for Delaware, Lackawanna & Western R R. Co., G. A. Phillips, ch. engr., Passenger Terminal, Hoboken, N. J. **$140,000.** CD 12/20—**ENR 12/23.**

N. Y., Peekskill—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing at Croton River, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$280,000.** CD 12/20—ENR 12/23.

N. Y., Saugerties—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing at Saugerties—Greene Co. line, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$300,000.** CD 12/20—ENR 12/23.

N. Y., Scotia—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing at Ballston Ave., for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York, and Boston & Maine R. R. T. G. Sughrue, ch. engr., 150 Causeway, Boston, Mass. **$450,000.** CD 12/20—ENR 12/23.

N. Y., Syracuse—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing at James St., for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$375,000.** CD 12/20—ENR 12/23.

N. Y., Utica—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed raising Bridge E. 44, on Barge Canal. **$115,000.** CD 12/30—ENR 1/13.

N. Y., Watertown-Philadelphia — State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing, for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$240,000.** CD 12/20—ENR 12/23.

N. Y., Whitehall Corners-Wright Corners—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed reconstructing grade crossing for New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York. **$120,000.** CD 12/20—ENR 12/23.

★**Utah**—State Hy. Comn., Salt Lake City, plans completed 384 ft. span rein.-con. Riverdale Overpass, 54 ft. roadway, FAP-31 at Riverdale, near Ogden; 222 ft. span Weber River Bridge, FAP-114, at Ogden; 29 ft. span Bootlegger Wash Bridge, FAP-101, near Thompsons; 84 ft. span steel Sevier River Bridge, U. S. Hy. 6, near Delta; 102 ft. span timber, steel San Rafael Bridge, State Rd. 24, near Green River; 560 ft. span timber, steel, concrete Fremont River Bridge, State Rd. 24, near Hanksville; 25 ft. span concrete Fish Creek Bridge, FAS-101, near Huntington; 30 ft. span bridge over Wash, FAP-101, between Green River and Crescent Junction; 80 ft. span Jordan River Bridge, State Rd. 186, at Salt Lake City; 464 ft. span, steel, concrete Green River Bridge, FAP-75 at Green River; 158 ft. span Browns Wash Bridge, FAP-100, between Green River and Crescent Junction; 54.5 ft. span bridge over Wash, FAP-100, between Green River and Crescent Junction, 54.5 ft. span bridge over Wash (No. 2), FAP-100, between Green River and Crescent Junction; 150 ft. span Floy Wash Bridge, FAP-100, between Green River and Crescent Junction; 153 ft. span Ferron Creek Bridge, FAP-4, at Ferron; 84 ft. span, Jordan River Bridge, FAS-95, west of Lehi; 63 ft. span Skull Valley Drain Bridge, FAP-51, between Timpee and Knolls; 35 ft. span Dell Channel Bridge, FAP-51; between Timpee and Knolls. **$809,000.**

STREETS AND ROADS

PLANS UNDER WAY

★**Ala., Anniston**—City, City Hall, concrete paving, walks, curbs, gutter. **$735,000.** Ladd Eng. Co., 209 Park Bldg., Mobile, consult. engr.

Calif., Long Beach—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans 25% completed asphaltic concrete and concrete and granite paving miscellaneous streets. **$130,000,** Funds available; concrete paving, widening Pico Ave. to Anaheim St., **$90,700** ($45,350 available). R. R. Shoemaker, ch. harbor engrs. G. E. Baker, City Hall, city engr.

★**Calif., Long Beach**—City, City Hall, constructing 20 street projects, incl. impvr. Los Angeles Freeway (Pico Ave.) between Anaheim St. and city boundary at Wardlow Rd., **$6,450,000,** ($1,000,000 available). To be financed with Gas Tax Funds. G. E. Baker, City Hall, city engr.

Calif., Redwood City—City, City Hall, plans under way constructing, reconstructing streets. **$52,000.** Bonds voted R. J. Clarke, City Hall, acting city engr. CD 11/16—ENR 11/30.

★**Calif., San Diego** — City, Civic Center, plans completed new freeway, **$3,000,000;** plans under way streets, street widening, traffic signals, street lighting, resurfacing, **$2,976,000.** Land rights not cleared, legal obstacles to be overcome and financing not provided. City and State Hy. Dpts., engrs.

Ga., Vienna—Town, plans 80% completed paving streets and resurfacing others. **$92,000.** Financing partly completed. Smith & Gillespie, Rogers Bldg., Jacksonville 1, Fla., consult. engrs.

★**Ind., South Bend**—City, 218 N. Main St., paving, widening, resurfacing within city. **$6,000,000.** C. E. Williams, City Hall, city engr. CD 7/28—ENR 8/10.

Ia., Allison—Butler Co., Allison, grading, bridging, surfacing County Trunk A from northwest corner Sect. 14-92-16, east through Clarksville to northeast corner Sect. 24-92-15 on Butler-Bremer Co. line, **$93,500;** grading,

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POSTWAR PROJECTS (Cont'd.)

bridge repair, surfacing County Trunk J from New Hartford, 7½ mi. north to line of Sect. 32-91-15, **$22,500**; grading, surfacing County Trunk H from southwest corner Sect. 17 Monroe, north for 1½ mi., **$6,100**; plans 25% completed grading bridging, surfacing County Trunk H from Bristow North to Butler-Floyd Co. line, **$54,000**. F. R. Johnson, Allison, co. engr.

Ia., Atlantic—Cass Co., Atlantic, plans 50% completed grading 6 mi., surfacing 21 mi. **$77,000.**

Ia., Boone—Bd. Supervs. Boone Co., Court House, plans completed grading, draining, gravel surfacing 34.95 mi. farm to market roads, **$335,217.** Land rights not cleared, financing not provided. Lechner Engineering Service, Ames, consult. engrs. P. V. Saum, Boone co. engr.

Ia., Clinton — Bd. Supervs. Clinton Co., Court House, Clinton, plans 95% completed County Road Projects 156 and 215, **$110,000.** Funds available. H. O. Paulson, Court House, co. engr.

★**Ia., Council Bluffs**—Pottawattamie Co., Council Bluffs, plans 75% completed grading, bridging, surfacing, etc., 61 mi. county trunk road; surfacing 40 mi. county trunk road; low cost bituminous surfacing 111.5 mi. county trunk road; grading, bridging 96 mi. local roads. **$975,000.** Land rights not cleared. D. N. Blacke, Court House, Council Bluffs, co. engr.

Ia., Davenport—City, City Hall, concrete paving, incl. curbing, guttering, **$50,000.** R. C. Graham, City Hall, supt. Constr. E. D. Stapp, city engr.

★**Ia., Elkader**—Bd. Supervs. Clayton Co., Elkader, grading, surfacing 138.6 mi. local roads. **$422,280**; plans 90% completed grading, culverts, surfacing 11.5 mi. trunk road, **$122,250**; plans completed grading, culverts, bridge surfacing 2.3 mi. trunk roads, **$103,613.** Land rights not cleared; plans 50% completed grading, culverts, surfacing 5 projects, 10.38 mi. trunk roads, **$162,901.** D. E. Hoover, Elkader, co. engr.

Ia., Garner—Hancock Co., Garner, plans 40% completed 9 mi. grading, graveling, culverts, incl. 108,000 cu. yd. earth excav., 9,000 cu. yd. gravel surfacing, concrete box and pipe culverts. **$55,000.** State Hy. Comn., Ames, consult. engrs. C. F. Merten, Garner, co. engr.

Ia., Glenwood—Mills Co., Court House, Glenwood, plans 75% completed grading, draining 21.7 mi. roads. **$177,131.** Funds available. Land rights not cleared, legal obstacles to be overcome. C. A. Davis, 201 N. Chestnut St., co. engr.

Ia., Greenfield—Adair Co., Greenfield, grading 6 mi. from southwest corner Sect. 29, Lee Twp. east to southeast corner of Sect. 30, Grand River Twp., **$30,000**; 4.5 mi. grading from southeast corner Sect. 18, Jackson Twp. north to east quarter corner of Sect. 30, Eureka Twp., **$22,500**; 3 mi. grading from southeast corner Sect. 5, Harrison Twp., east to County Trunk Road L **$15,000**; 3 mi. grading from Camby east to County Trunk Road B **$15,000.** F. A. Malcolm, Greenfield, co. engr.

Ia., Hampton — Franklin Co., Hampton, plans 75% completed 54.6 mi. grading, 54.6 mi. gravel surfacing, 8 mi. oiled surface. **$187,170.** Iowa State Hy. Comn., Ames, consult. engr. C. P. Rudisill, Hampton, co. engr.

★**Ia., Keokuk**—City, City Hall, plans 25% completed concrete pavement relocation U. S. Hy. 61 and 218, **$231,600,** legal obstacles to be overcome. Iowa State Hy. Comn., Ames, consult. engrs.; plans 10% completed light wearing coat bituminous material resurfacing paved streets **$60,000,** concrete paving Commercial St. **$485,000.** Financing not provided. C. J. Nelson, City Hall, city engr.

Kan., Atchison—City, City Hall, plans under way city-wide program new concrete and 2 in. asphalt resurfacing. **$140,000.** E. Hellener, Atchison, city engr. CD 8/31—ENR 9/21.

Kan., Clay Center—Clay Co., Clay Center, plans 60% completed road and bridges, **$200,000** per year for 3 year period. Land rights not cleared. C. Quinn, Clay Center, engr.

Kan., Olathe—City, City Hall, plans 20% completed hot top asphalt surfacing old brick pavements. **$168,000.** Bonds voted. C. Payne, City Hall, city engr.

Kan., Olathe—Johnson Co., Olathe, low cost bituminous road work. **$35,000.** C. Payne, Olathe, co. engr.

Ky., Danville—City, City Hall, plans 20% completed street pavements, curb and gutter, concrete sidewalks. **$108,042.** A. L. Tuttle, City Hall, city engr.

Ky., Owensboro—City, City Hall, curbing, guttering concrete or bituminous materials paving streets in various parts of town. **$200,000.** C. J. Keeley, City Hall, city engr.

★**Missouri**—State Hy Comn., Jefferson City, plans 90% completed graded earth and concrete surfacing 0.622 mi. road from Buchanan Co. line north, Route 71, Proj. FA 750-B2, Andrew Co., **$25,000**; 2.4 mi. road from Boonville to Columbia, Route 40, Proj. FA 229-A3, Boone Co., **$255,000**; 1.573 mi. road from St. Joseph to Andrew Co. line, Route 71, Proj. 750-C1, Buchanan

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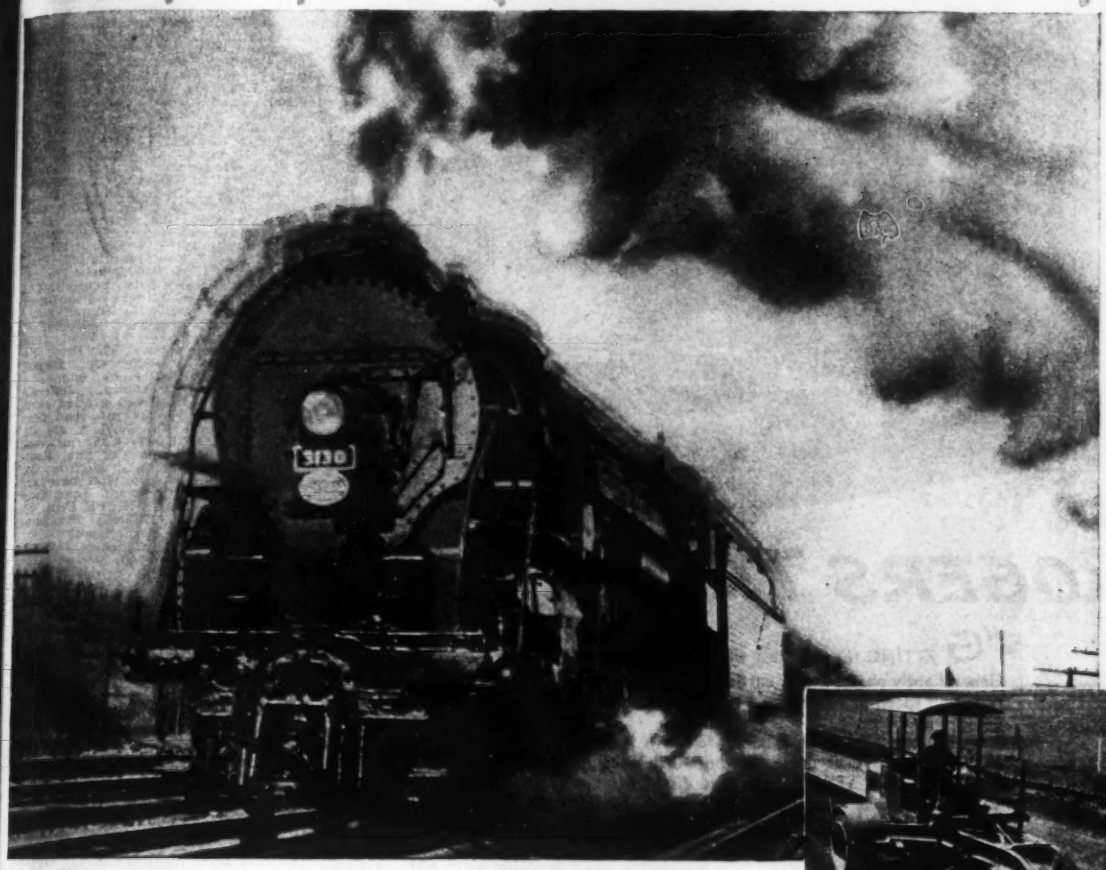

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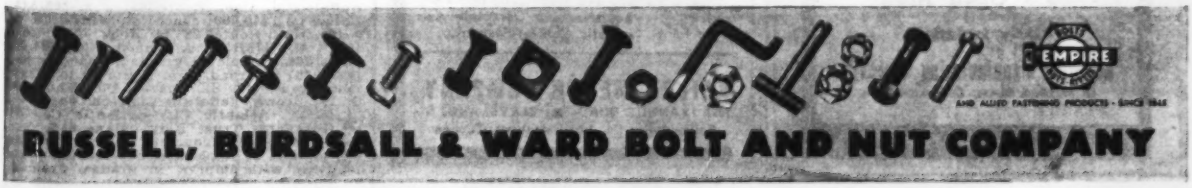

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POSTWAR PROJECTS (Cont'd.)

Co., **$181,000**; 0.442 mi. road from Pleasant Hill north and south, Route 7, Proj. FA GM 741-E1, **$80,000**; 0.691 mi. road from Pleasant Hill north and south, Route 7, Proj. FA GH 741-E1, **$200,000**, both Cass Co.; 0.524 mi. road from Pleasant Hill north and south, Route 7, Proj. FA 741-D2, Cass Co., **$40,000**; 4.531 mi. road from Windsor to Calhoun, Route 52, Proj. FA 133-A6, Henry Co., **$162,000**; 4.257 mi. road from Winfield to Old Monroe, Route 79, FA 299-D1, Lincoln Co., **$180,000**; 1.2 mi. road from Chillicothe to Mason, Route 36, Proj. FA 232-F2, Livingston Co., **$140,000**; 8.478 mi. road from Pickering north, Route 27, Proj. FA 336-A2, B3 and C2, Nodaway Co., **$137,350**; 0.31 mi. road from Henrietta north and south, Route 13, Proj. FA GM 335-F2, **$251,000**; 0.272 mi. road from Henrietta north and south, Route 13, Proj. FA GH 335-F2, **$38,000**; 0.493 mi. road from Henrietta north and south, Route 13, Proj. FA 335-E2, **$300,000**, all foregoing Ray Co.; 1.337 mi. road from Route 13 East, Route 40, Proj. FA 238-A2, Saline Co., **$200,000**; 4.915 mi. from Green top to Queen City, Schuyler Co., **$260,000**; graded earth and gravel surfacing 3.793 mi. road from Belle to Bland, Route 28, Proj. FA 813-C1, Osage Co., **$48,000**; bituminous surfacing 3.551 mi. road from Eldon to Versailles, Route 52, Proj. FA 800-D2, and FA 474-2, Miller Co., **$30,000**. C. W. Brown, Jefferson City, ch. engr.

★**Missouri**—State Hy. Comn., Jefferson City, plans 90% completed graded earth and concrete surfacing 4.086 mi. road from Route 65 west, Route 40, Project 238 C2, D2, E2, Saline Co., **$525,000**; 6.351 mi. road from Route A to Randolph Co. line, Route 24, Proj. FA 301 E1, F1, Monroe Co., **$332,350**; graded earth, stabilized base and bituminous surfacing 13.424 mi. road from Parkville to Beverly, Route 45, TR Proj. 42, B2, C1, D1, Platte Co., **$373,000**. Financing not provided. C. W. Brown, ch. engr.

★**Missouri**—State Hy. Comn., Jefferson City, plans 90% completed graded earth, concrete surfacing 4.201 mi. road through Waynesville, Route 66, F.A.-139-F(2) G (3), Pulaski Co., **$465,000**; 5.625 mi. road from Jasper north, Route 71-FA-170-E(1), F(1), Barton Co., **$400,000**; 12.795 mi. road from Mt. Vernon to Greene Co. line, Route 14-FA-53(6), 53 (7) and 53 (8), Lawrence Co., **$999,700**; 0.568 mi. road Goodman Underpass, Route 71-F.A. G.H. 146 B(1), McDonald Co., **$107,600**; 4.611 mi. road from Neosho South, Route 71-SN-FA 83 E(1) and SN-FA 83 F(1), Newton Co., **$326,657**; 2.464 mi. road from Goodman North, Route 71-SN-FA 146-C(1), McDonald Co., **$208,758**; 0.717 mi. road from end of slab to Co. line, Route 66-SN-A-F.A. 176-J (1), Phelps Co., **$144,133**; 2.773 mi. road rock cut to Phelps Co. line, Route 66-FN-F.A. 176-H (2) and SN-A-F.A. 176 I (1), Pulaski Co., **$479,880**; 6.342 mi. road from Republic Co. line, Route 14-FA 457-C(1), D(1), Greene Co., **$512,000**; road from Kansas Ave. to grade separation, Route 14-PW-FAGM-WPG-868-A(1), Greene Co., **$90,000**; 13.813 mi. road from Mansfield to Mountain Grove, Route 60-P.W.F.A. 515 B(1), C(1), D(1) and E(1), Wright Co., **$790,114**; 6.544 mi. road from Holcomb to Campbell, Route 53-F.A.221-A(6) B(2) and B(3), Dunklin Co., **$290,000**; 12.42 mi. road from Fredericktown, south Route 67-P.W.F.A. 101-B(4), B(5), B(6) and B(7), Madison Co., **$1,055,420**; 8.655 mi. road from Paris to Route A, Route 24, Proj. F.A.-301 C(2), D(1), Monroe Co., **$483,456**; 7.151 mi. road from Route 63 to Monroe Co. line, Route 24, Proj. F.A. 301-A (3) and B(2), Randolph Co., **$472,471**; 3.949 mi. road from Howard Co. line east, Route 40, Proj. F.A.-229-B(3), A(4), Boone Co., **$425,000**; 7.7 mi. road from Boonville to Columbia, Route 40, Proj. F.A.-235-A(2), B(2), C(6), Howard Co., **$155,000**; graded earth and surfacing 2.963 mi. road from Chaffee north, Route 55 AP-F.A. 814-A(1), B(1) and C(1), Cape Girardeau and Scott Counties, **$125,000**; 10.282 mi. road from Bloomfield to Advance, Route 25-F.A.-187 (3), 187 (4), 197-A(2), Stoddard Co., **$406,000**; 0.392 mi. road at Sabula Route 49-P.W.F.A. 105 B(2), Iron Co., **$17,740**; 0.568 mi. road from Sabula Missouri Pacific grade separation, Iron Co., **$160,650**; bituminous surfacing 13.845 mi. road from Eldon to Versailles, Route 52, Proj. F.A.-800-A(2), B(2), C(2), Morgan Co., **$97,000**; 9.17 mi. road from Paris to Mexico, Route 15, Proj. 377 C2, D(2), E(2), Monroe Co., **$60,760**; 15.966 mi. road from Paris to Mexico, Route 15, Proj. F.A.-465-B(2), C(2), D(2), E(2), F(2), Audrain Co., **$107,010**; base stabilization and bituminous surfacing 4.668 mi. road from Herman to Franklin Co. line, Route 100 TR Proj. 433-A(2), Gasconade Co., **$67,000**; 9.767 mi. road from New Haven to Gasconade Co. line, Route 100 TR, Proj. F.A.-433-B(2), C(2), D(2), E(2), Franklin Co., **$125,000**; 3.34 mi. road from Van Buren east, Route 60, F.A.-550-B(1), Carter Co., **$120,000**; imprv. 4.5 mi. road from Buffalo Co. line, Route 64, F.A.-382-A(1), Dallas Co., **$70,000**; concrete paving 1.038 mi. road from Route 28 to Rock Cut, Route 66-SN FA 176B(4), A, Pulaski Co., **$94,220**; plans 10% completed grading, concrete paving, 9.767 mi. road from Route 79 to Wentzville, Route 40, St. Charles Co., **$1,230,000**. C. W. Brown, Jefferson City, ch. engr.

★**N. J., Atlantic City**—Atlantic Co., 741 Guarantee Trust Bldg., plans 65% completed 4-channel concrete roadway replacing present 24 in. bituminous treated gravel roadway with imprvs. in grades, drainage,

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POSTWAR PROJECTS (Cont'd.)

etc., Pleasantville-Egg Harbor Twp. **$850,000.** Financing not provided. A. H. Nelson, 741 Guarantee Trust Bldg., co. engr.

N. J., Collingswood—Borough of Collingswood, Borough Hall, bituminous resurfacing present streets and constructing curb and sidewalks and municipal parking lot, **$151,600.** J. H. Osler, Jr., 717 Belmont Ave., Collingswood, engr.

N. J., Flemington—Bd. Freeholders Hunterdon Co., Flemington, plans 75% completed grading, drainage structures, modified penetration macadam paving 1.32 mi. Readington Twp., **$40,000;** plans 60% completed grading, drainage structures, 20 ft. 9 in. rein.-con. paving with 5 ft. earth shoulders, widening 2 concrete culverts, curbs, etc. 1.21 mi., in Frenchtown-Milford, **$75,000;** plans 20% completed grading, drainage structures modified penetration macadam paving 1.7 mi. in Lambertville, **$90,000.** Land rights not cleared, financing not provided. E. S. Disbrow, Flemington, co. engr.

★**N. J., Irvington**—Town, parkway through town. **$600,000.** Land rights not cleared, legal obstacles to be overcome, financing not provided. I. J. Casey, Jr., Municipal Bldg., engr. CD 11/12/43—ENR 11/18/43.

★**N. J., Plainfield**—City, City Hall, plans 50% completed 5 mi. bituminous concrete on concrete paving replacing old brick and macadam pavements. **$530,000.** H. E. Bush, City Hall, city engr.

N. Y., Dansville—Village, plans under way street imprvs., concrete curb and gutters **$150,000.** Wm. S. Lozier Co., 10 Gibbs St., Rochester, Zone 4, consult. engr. CD 10/12—ENR 11/2.

Wash., Longview—City, City Hall, voted bonds street imprvs. **$95,500.** J. Jones, City Hall, city engr. CD 9/29—ENR 10/19.

★**Wis., Manitowoc**—Manitowoc Co. Hy. Comn., Manitowoc, 10 year road program, 1st year imprv. 8.25 mi. Co. Trunk B, Manitowoc to Shot, **$120,000;** 9 mi. Co. Trunk C, St. Nazian to Hy. 141, **$135,000;** 3.65 mi. Co. Trunk K, Hy. 10 to Tais Rd., **$14,600;** 3 mi. Co. Trunk Z, Hy. 10 to county line, **$17,000;** 6.67 mi. Co. Trunk G, Grimmer-Maple Grove north to county line, **$26,600;** 6.84 mi. Co. Trunk H, Hy. 11 to Manitowoc, **$68,400;** 2nd year, imprv. 1.52 mi. Co. Trunk S, Reif Mills-Kellensville Rd., **$15,000;** 3.74 mi. Co. Trunk J, West County Line Rd., **$56,000;** Co. Trunk A, filling ½ mi. through swamp, **$20,000;** 10 mi. Co. Trunk D, Branch-Two Rivers Rd., **$150,000;** 1 mi. Co. trunk D, **$15,000;** 3.25 mi. Co. Trunk Y, Melnick to Hy. Q, **$48,750;** 3rd year, imprv. 9 mi. Co. Trunk H and C, **$36,000;** 5.75 mi. Co. Trunk A, **$57,500;** 8.5 mi. Co. Trunk J, **$34,000;** 3 mi. Co. Trunk K, **$12,000;** 1 mi. Co. Trunk Hy. H-Cleveland-Hika Rd., **$14,000;** Cleveland—concrete between curb and pavement, **$6,500;** Newton Sta., **$2,500;** Co. Trunk A, **$12,000;** 4th year, Francis Creek—concrete between curb and pavement, **$3,750;** 6.84 mi. Co. Trunk U, **$27,500;** 3.25 mi. Co. Trunk Y, **$13,000;** 4 mi. Co. Trunk V **$40,000;** Co. Trunk E—Millhome to so. county line, **$2,500;** 4 mi. Co. Trunk Q, Kingsbridge to Larrabee, **$40,000;** 1.5 mi. Co. Trunk A, Kiel-Rockville, **$22,500;** 5th year, imprv. 5.75 mi. Co. Trunk A, Cato-Taus, **$23,000;** 4 mi. Co. Trunk V, Mishicot to Hy. 42, **$16,000;** 6 mi. Co. Trunk Q, Manitowoc to 11 V, **$60,000;** 1.5 mi. Co. Trunk A, Kiel-Rockville, **$22,500;** 6th year, 0.25 mi. Co. Trunk E—Millhome Rd., **$1,000;** 4 mi. Co. Trunk Q-Kings Bridge-Larrabee, **$16,000;** 3 mi. Co. Trunk AA-Kiel, **$12,000;** 5.75 mi. Co. Trunk M-School Hill Rd., **$57,500;** 3.5 mi. Co. Trunk GG, **$35,000;** 7th year 4.25 mi. Co. Trunk Q, Larrabee to north co. line, **$42,500;** 6.6 mi. Co. Trunk Q, **$24,000;** 1.75 mi. Co. Trunk MM, **$17,500;** 1.5 mi. Co. Trunk P, **$6,000;** 6.5 mi. Co. Trunk V, **$65,000;** 8th year, 6.75 mi. Co. Trunk K, Hy. G to West Co. line, **$67,500;** 2 mi. Co. Trunk NN, Menchalville north, **$20,000;** 5.74 mi. Co. Trunk M, **$23,000;** 3.5 mi. Co. Trunk GG, **$14,000;** 3.5 mi. Co. Trunk T, **$35,000;** 9th year, 2 mi. Co. Trunk K, Hys. G to 32 **$8,000;** 6.5 mi. Co. Trunk V, **$26,000;** 4.25 mi. Co. Trunk O, **$17,000;** 5.5 mi. Co. Trunk B, **$55,000;** 2.25 mi. Co. Trunk NN, **$22,500;** 10th year, imprv. 4.75 mi. Co. Trunk K, Hy. 32 to West Co. line, **$19,000;** 1 mi. Co. Trunk W-Newtonburg Rd., **$14,000;** 4 mi. Co. Trunk CC, **$56,000;** 3.5 mi. Co. Trunk T, **$14,000;** 1.75 mi. Co. Trunk MM, **$7,000;** 4.25 mi. Co. Trunk NN, **$17,000;** 10 mi. Co. Trunk BB, **$22,000.** E. T. Berkedal, Manitowoc, engr.

READY FOR BIDS

Ia., Emmetsburg—Palo Alto Co., Emmetsburg, plans completed road grading, graveling, **$85,000.** T. R. Martin, Emmetsburg, co. engr.

Ia., Garner—Bd. Supervs. Hancock Co., Garner, plans completed 16 mi. grading, graveling incl. 192,000 cu. yd. earth excav. 16,000 cu. yd. gravel surfacing, concrete box and pipe culverts, **$95,000.** State Hy. Comn., Ames, consult. engrs. C. F. Merten, Garner, co. engr.

N. J., Flemington—Bd. Freeholders Hunterdon Co., Flemington, plans completed grading, drainage structures, modified penetration macadam paving 0.5 mi. Union Twp., **$18,000;** widening present 10 ft. macadam pavement to 20 ft. and resurfacing entire width with 1 in. bituminous concrete, drainage structures, grading, and shoulder work 2.06 mi. Franklin Twp., **$40,000.** E. S. Disbrow, Flemington, co. engr.

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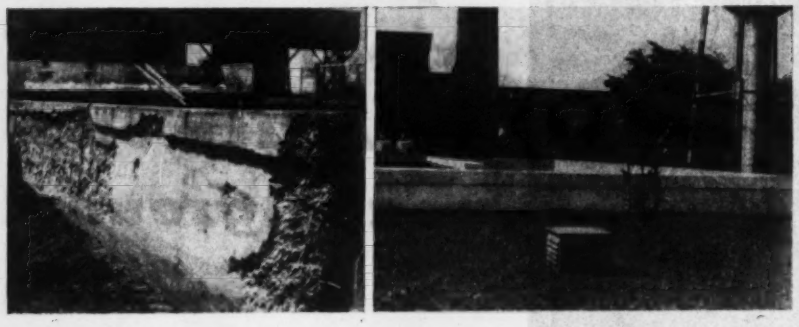

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As shown to the left, the original concrete walls of this basin were badly deteriorated. All disintegrated concrete was chipped out to a solid surface and reinforcing mesh bolted in place. An average of more than two inches of "GUNITE" was placed on the inside and outside of the walls. The filter beds at the same plant were similarly restored.

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POSTWAR PROJECTS (Cont'd.)

N. J., Irvington—Town, plans completed laying permanent pavements, 12 streets, $100,000. I. J. Casey, Jr., Municipal Bldg., town engr. CD 11/12/43—ENR 11/18/43.

EARTHWORK, WATERWAYS

PROPOSED WORK

Va., Richmond—City, G. Bowers, dir. Dpt. P. Wks., City Hall, converting city dumps from open to filled dumps, $38,000.

PLANS UNDER WAY

★ **Calif., Long Beach**—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans 25% completed mole construction and fill, Southeast Basin. $3,000,000. Funds available. R. R. Shoemaker, ch. harbor engr. G. H. Baker, city engr.

Calif., Redwood City—City, City Hall, plans under way draining and flood control, for creeks and channels. $33,000. Bonds voted. R. J. Clarke, City Hall, acting city engr. CD 11/16—ENR 11/30.

Indiana—State, Dpt. Conservation, B. Brennan, exec.-secy., State Library Bldg., Indianapolis, flood control and water conservation East Fork of White River Watershed, incl. 800 to 900 ft. dam, 30 ft. high, Big Blue River, below mouth of Buck Creek, Knightstown, Henny Co.; 800 to 1,000 ft. interurban fill, opening 100 ft., to be made into dam 25 to 35 ft. high, Sugar Creek, New Palestine, Hancock Co.; 800 ft. dam, 30 ft. high, Sugar Creek, Greenfield, Hancock Co.; 1,200 ft. dam, 25 to 30 ft. high, Big Blue River, Carthage; 1,000 ft. dam, 40 ft. high, alternate dam ¾ mi. below above site, 200 ft. dam, 40 ft. high, Moscow, both Rush Co.; 700 ft. dam, 50 ft. high across Flat Rock River, St. Paul, Decatur Co.; 500 to 600 ft. dam, 50 to 60 ft. high, Butlerville, Jennings Co.; 200 ft. dam, 75 ft. high, Muscatatuck River, North Vernon, Jennings Co.; 200 ft. dam, 30 to 45 ft. high, Muscatatuck River, Deputy, Jefferson Co.; 1,500 ft. dam, 60 to 75 ft. high, Muddy Fork of Salt Creek, Maumee, Jackson Co.; 1,200 to 1,400 ft. dam, 100 ft. high, North Fork of Salt Creek, Taggart, Brown Co.; 1,600 to 1,800 ft. dam, 75 ft. high, Middle Fork of Salt Creek, Elkinsville, Brown Co.; 1,600 to 2,000 ft. dam, 125 ft. high Middle Fork of Salt Creek, southwest corner, Brown Co.; 2,400 ft. dam, 125 ft. high, Lick Fork of Salt Creek, east of county line 1¼ mi. south of Highway 46; 1,600 ft. dam, 60 ft. high or 2,200 ft. dam, 120 ft. high, Lick Fork of Salt Creek, east of county line, 3 mi. south of Highway 46; 1,800 ft. dam, 75 ft. high, Lick Fork of Salt Creek, Payne; 1,600 ft. dam, 80 ft. high, Salt Creek, Harrodsburg, all foregoing Monroe Co.; 1,800 ft. to 2,000 ft. dam, 100 ft. high, Indian Creek, Silverville, Lawrence Co.; 1,800 to 2,000 ft. dam, 75 ft. high, Guthrie Creek, Buddah, Lawrence Co.; 1,200 ft. dam, 35 ft. high, Guthrie Creek, Tunnelton, Lawrence Co. Financing not provided. C. H. Bechert, c/o owner, ch. engr.

★ **Ia., Keokuk**—City, City Hall, plans 5% completed concrete or steel piling sea wall on river front, flood protection for factories. $1,110,000. Financing not provided. C. J. Nelson, City Hall, city engr.

Kan., Horton—City, City Hall, plans 75% completed rebuilding spillway at Mission Lake, 1st section underpin weir to cost $15,000. Total est. $112,000. Burns & McDonnell Engrg. Co., 107 W. Linwood Blvd., Kansas City 2, Mo., consult. engrs.

Kan., Hutchinson—City, City Hall, plans 50% completed flood control, drainage, dykes and bridges, $800,000; plans 95% completed drainage canal and concrete culverts, $80,000. Land rights not cleared. A. R. Campbell, City Hall, city engr. CD 11/5/43—ENR 11/11/43.

READY FOR BIDS

N. Y., Herkimer—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed removal, replacement Guard Gate 5, on Barge Canal, $320,000. C. J. White, comr. Architecture, State Office Bldg., Albany, engr. CD 12/31—ENR 1/13.

N. Y., Little Falls—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed removal, replacement Guard Gate 4, on Barge Canal. $140,000. CD 12/30—ENR 1/13.

N. Y., Rome—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed bank protection at Lock 21, on Barge Canal. $340,000. CD 12/31—ENR 1/13.

★ **Texas**—U. S. Engr., 25 St. and Avenue F, Galveston, plans completed completing 121 mi. stretch Intracoastal Canal between Corpus Christi and Port Isabel, $1,700,000; dredging Intracoastal Canal to connect Brownsville, Port Isabel and Harlingen, for water transportation, $1,620,000. Funds appropriated.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Long Beach—City Recreation Comn., W. L. Scott, dir., Municipal Auditorium, civic auditorium, $600,000; Bixby Park Clubhouse, $150,000; Lincoln Park clubhouse, $57,000. Financing not provided.

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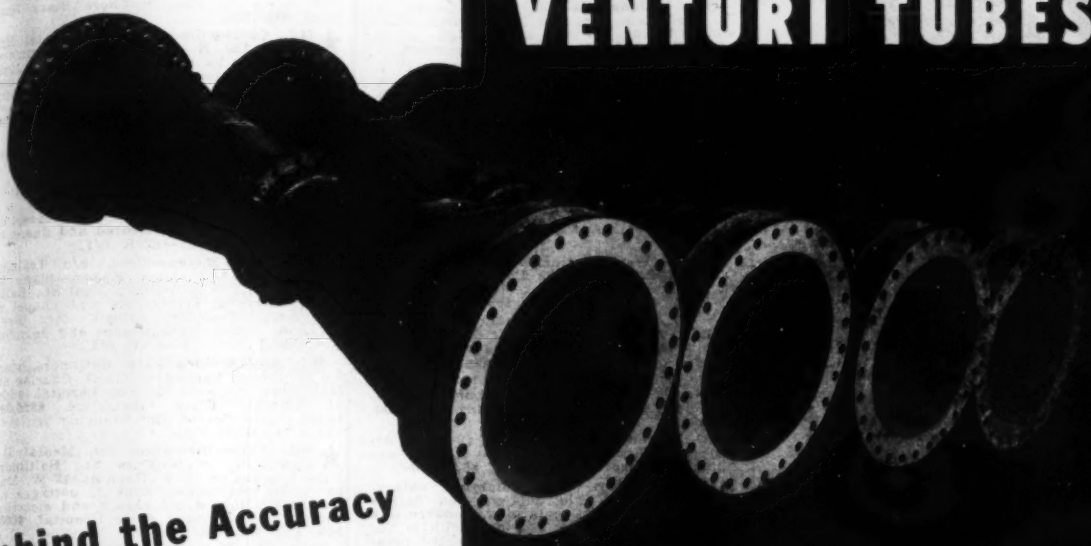

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POSTWAR PROJECTS (Cont'd.)

†**Colo., Denver**—Pub. Bldgs. Admin., 18 and F Sts. N.W. Wash. 25, D. C., parcel post bldg. **$200,000. FWA.**

Conn., Berlin—Town, A. L. Woodruff, clk., Town Hall, high school, Patterson Rd., 15 acre site between Farmington and Lower Lane. Over **$150,000.**

★ **Idaho, Orofino**—State Hospital, Orofino, administration bldg., **$325,000**; hospital ward bldg., **$225,000**; central heating plant, **$115,000.**

★ **Idaho, Pocatello** — Pocatello Housing Auth., Pocatello, 150 housing units. **$750,000. FWA funds sought.**

Ind., Indianapolis—Bd. School Comrs., A. B. Good, bus. dir., 150 N. Meridian St., 2 story, bsmnt., brick, stone high school addn. **$300,000.** Financing not provided.

Ind., Wabash—Bd. School Trustees, C. L. Vandergrift, supt., 1 story, bsmnt., brick, rein.-con., structural steel high school auditorium addn. **$150,000.** Financing not provided.

Kan., Topeka—City, City Hall, plans bond election, administration bldg. **$150,000.**

Md., Annapolis—Comrs. Anne Arundel Co., Court House, 3 story, bsmnt., brick court house annex, **$150,000.**

Mass., Lynn—City School Dpt., City Hall, Ingalls School, over **$150,000. Financing not** provided.

Mass., West Springfield — Town, F. O'Keefe, chn. Comn., 88 Lowell St., 100x200 ft., concrete, brick, steel gymnatorium, **$175,000.** Financing not provided.

N. H., Concord—City, Bd. Educ., City Hall, making surveys Conant School addn., over **$150,000**; school replacing old Rumford School, over **$150,000. Financing not** provided.

★ **N. C., Charlotte**—Mecklenburg Co. Bd. Educ., Charlotte, school addns. **$650,000.** Financing not provided.

★ **O., Akron**—City Bd. Educ., C. R. Foust, pres., City Hall, approved bond issue imprv., constructing schools. **$5,980,000.**

★ **O., Sandusky**—State, Columbus, enlarging, imprv. Ohio Soldiers and Sailors Home, incl. bldgs., enlarging, modernizing present structures to provide facilities for 3,000 veterans as compared with 300 present residents. **$2,140,200.**

★ **Wash., Aberdeen**—School Bd.; Senior High School, **$500,000**; Junior High School, **$250,000.**

Wash., Elma—School Bd., Senior High School. Over **$150,000.**

Wash., Kelso—School Bd., Kelso, high school and grade school. Over **$150,000** each.

★ **Wyo., Cheyenne**—Bd. Educ., City Hall, 5 school bldgs. **$1,000,000** Financing not provided.

Alaska, Fairbanks—University of Alaska, C. E. Bunnell, pres., 4 story, bsmnt., administration bldg., over **$200,000**; 3 story, rein.-con. exten. to Ellson Memorial Bldg., over **$150,000.**

★ †**Virgin Islands**—Federal Works Agency, 18 and F Sts. N. W., Wash. 25, D. C., hospital bldgs. **$565,000**, sanitation and fire-protection facilities, incl. sewer and water sys. **$563,695**, intercepting sewerage sys., incl. sewage treatment and disposal **$278,000**, water supply facilities **$883,750**, schools and educational bldgs. **$566,000**; water-front highway, sea wall, and harbor facilities **$1,097,500**, highways and roads **$1,387,300**, street imprvs., incl. storm-water drainage **$327,200**, imprv., constructing bldgs. **$630,-000**, recreational facilities **$80,000**, telephone and radio communication facilities **$170,000**, abattoir and cooling plant facilities, **$75,000**, on Saint Thomas and Saint John Islands; hospital bldgs. **$475,000**, sanitation and fire protection facilities, incl. sewer and water sys. **$344,600**, water supply facilities **$490,-000**, school and educational facilities **$510,-000**, highways and roads **$696,000**, telephone and radio communication facilities **$150,-000**, municipal pier for Christiansted **$190,-000**, public market facilities **$174,000**, on Saint Croix Island.

PLANS UNDER WAY

Ala., Anniston—City, City Hall, plans 15% completed by L. R. Paceley, c/o Ladd Eng. Co., consult. engr., 209 Park Bldg., Mobile, city schools. **$300,000.** Financing not provided.

★ **Ala., Birmingham**—City, C. Green, mayor, City Hall, plans by G. P. Turner, Martin Bldg., city hall, **$1,500,000.** Site selected.

★ **Calif., Glendale**—City, P. Diederich, supt., Pub. Serv., 119 North Glendale Ave., plans completed steam electric generating plant, 2nd 20,000 kw. unit, **$1,200,000**; preliminary plans Public Service Dpt. warehouse, **$250,000**; Public Service garage bldg., **$41,800.** J. C. Albers, City Hall, city engr. CD 11/22—ENR 12/14.

★ **Calif., Long Beach**—**City Harbor Dpt.**, 1333W. El Embarcadero, Zone 2, plans 5% completed warehouse, Pier 2, **$675,000. Funds available.** R. R. Shoemaker, ch. harbor engr. C. H. Baker, City Hall, city engr.

Colo., Boulder—**Bd. Regents University** of Colorado, plans by **The Office** of C. Z. Klauder, 1429 Walnut St., Phila., Pa., women's dormitory, **$300,000.**

Conn., Plainville—Town, Sup. Schools, 74 East St., plans completed by W. Provoost, 421 Main St., Stamford, 2 story, bsmnt. high school addn. **$750,000.** Financing not provided. CD 9/7/43—ENR 9/9/43.

Kan., Horton—City, City Hall, enlarging power plant. Burns & McDonnell Engrg. Co., 107 W. Linwood Blvd., Kansas City 2, Mo., consult. engrs.

★ **Kan., Olathe**—Johnson Co., Olathe, court house. C. Payne, Olathe, co. engr.

Md., Cambridge—State Bd. Mental Hygiene, 330 N. Charles St., Baltimore, Zone 1, plans by W. T. Malone, Salisbury, bldg. for alcoholics, laundry bldg., new cannery and equip. at Eastern Shore State Hospital, **$183,200.**

★ **Md., Catonsville**—State Bd. Mental Hygiene, 330 N. Charles St., Baltimore, Zone 1, plans by H. P. Hopkins, 10 E. Mulberry St., Baltimore, Zone 1, cottage group industrial bldg., admitting bldg., and dairy and power plant addns., at Spring Grove State Hospital, **$844,000.** CD 5/24—ENR 6/1.

Md., Crownsville—State, c/o Bd. Mental Hygiene, 330 N. Charles St., Baltimore, Zone 1, plans by J. R. Edmunds, Jr., 409 Calvert Bldg., Baltimore, Zone 1, dormitory, nurses' home, cottages, power plant and farm bldgs., at Crownsville State Hospital, **$274,300.** Land rights cleared and financing provided. CD 5/22—ENR 6/1.

Md., Loch Raven—State, c/o Training School for Boys, Loch Raven, plans by Palmer & Lamdin, 1020 St. Paul St., Baltimore, cottages, gymnasium and chapel at Maryland Training School for Boys, **$271,750.** Land rights cleared and financing provided. CD 2/28—ENR 3/9.

Md., Sabillasville—State, Baltimore, plans by Buckler & Fenhagen, 325 N. Charles St., Baltimore, Zone 1, 100 bed hospital addn. at Maryland State Sanatorium, **$326,000.** Land rights cleared and financing provided. CD 2/28—ENR 3/9.

★ **Md., Sykesville**—State Bd. Mental Hygiene, 330 N. Charles St., Baltimore, Zone 1, plans by H. P. Hopkins, 10 W. Mulberry St., Baltimore, Zone 1, cottages attendants' home, water supply and electrical equip., at Springfield State Hospital, **$603,-800.** CD 5/24—ENR 6/1.

Mass., Grafton—Commonwealth of Massachusetts, Dpt. Mental Health, 100 Nashua St., Boston, plans 60% completed by Desmond & Lord, 6 Beacon St., Boston, brick, steel laundry, State Hospital grounds. **$60,-000.** Financing not provided. Hayden Harding & Buchanan, 662 Park Sq. Bldg., Boston, consult. engrs. CD 10/30—ENR 11/16.

Mass., Danvers—State Dpt. Mental Health, 100 Nashua St., Boston, plans 75% completed by M. A. Dyer Co., 8 Beacon St., Boston, 2 story, bsmnt., 60x100 ft., brick, steel laundry, State Hospital, PM-44, **$90,000.** Financing not provided. Hayden Harding & Buchanan, Park Sq. Bldg., Boston, consult. engrs. CD 10/11—ENR 10/19.

Mass., North Reading—Town, E. Parker, chn., Chestnut St., plans by Markus & Nocka, 184 Boylston St., Boston, brick, steel Senior-Junior High School. **$150,000.**

Mass., Shirley—State Dpt. Correction, State House, plans completed by J. R. Worcester & Co., engrs.-archts., 79 Milk St., Boston, brick staff bldg., PC-8 at Industrial School for Boys, **$150,000.** Financing not provided.

★ **Mass., Tewksbury** — Commonwealth of Massachusetts, Dpt. P. Health, State House, sketches by Leland & Larsen, 514 Statler Bldg., Boston, extensive infirmary alterations, PM-43. **$750,000.** Financing not provided.

Mich., Holland—City, City Hall, plans by L. C. Kingscott & Associates, 208 Elm St., Kalamazoo, civic bldg. Financing not provided.

★ **Mich., Lansing**—Bd. Educ., City Hall, plans by Warren S. Holmes Co., 2200 Olds Tower Bldg., Thomas Junior High School. **$750,000.**

★ **Mich., Marquette**—**State Administrative** Bd., Lansing, preliminary plans by D. E. Anderson, 310 Nester Bldg., brick, steel, stone, concrete prison bldg. Approx. **$500,000.**

★ **Mo., Webster Groves (St. Louis 19, P. O.)** —School Dist. of Webster Groves Bd. Educ., P. L. Wright, pres., and L. A. Steger, supt., 42 Selma Ave., preliminary plans 50% or more completed by Wm. B. Ittner, Inc., 911 Locust St., St. Louis, Zone 1, 1,600-spectator auditorium-gymnasium and cafeteria bldg., Bradford Ave., **$285,000**; gymnasium and cafeteria addn. to Goodall School, **$75,000**; high school athletic field, bleacher, shops, etc., **$91,000**; reconditioning Bristol School, **$17,500**; repairing other various schools, **$64,500**, **$800,000** bond issue approved. CD 11/13—ENR 11/30.

N. H., Newport—Town, School Dist., Newport, plans by Alfred T. Granger Assoc., Main St., Hanover, 3 story, bsmnt. Junior, Senior High School. **$350,000.** Financing not provided. CD 3/13—ENR 3/23.

N. J., Clayton—**School Dist. of Boro of** Clayton, Academy St. and Aura Rd., plans by Howell Louis Shay, Packard Bldg., Phila., Pa., brick bldg., incl. gymnasium, cafeteria and 4 classrooms, **$150,000.** Financing not provided.

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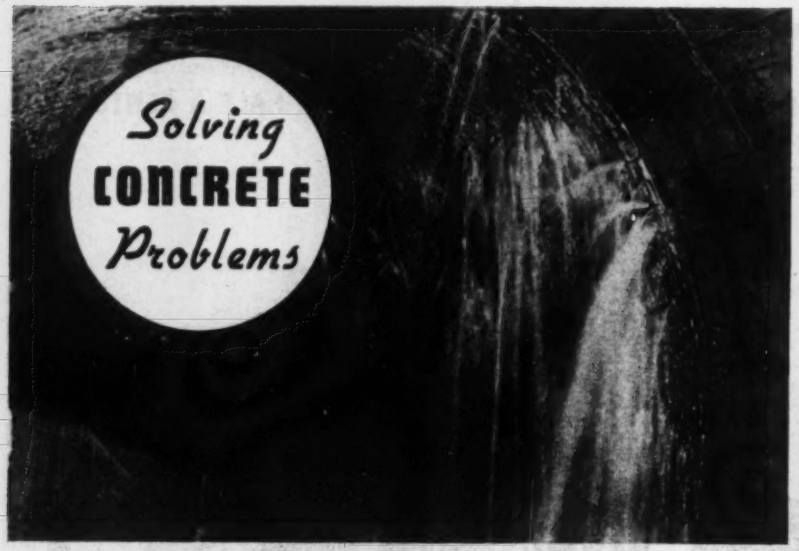

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POSTWAR PROJECTS (Cont'd)

★**N. Y., Jamaica**—Dpt. P. W., Municipal Bldg., New York, Zone 7, plans by A. J. Thomas, 153 E. 38 St., New York, Zone 16, addnl. wing for specialty services, HO-7[illegible] O.P.D. bldg., and admitting division, HO-2[illegible] at Queens General Hospital, for Dpt. Hospitals, 125 Worth St., New York, Zone 13, **$1,612,500.** Financing not provided.

O., Bexley—Bd. Educ., N. G. Fawcett, supt., Bexley, plans by Sims, Cornelius & Schooley, engrs. and archts., 2901 North High St., Columbus, school, small addns. to high school and Cassingham Elementary and Junior High School, remodeling Main Montrose School. **$350,000.** Financing available. CD 11/20—ENR 11/30.

★**O., Cincinnati**—City, W. [illegible] Kellogg, mgr., Municipal Bldg., preliminary sketches completed by Samuel Hannaford & Sons, Dixie Terminal Bldg., improv. Cincinnati General Hospital, **$1,000,000.** Bond issue approved. Fosdick & Hilmer, Third Union Trust Bldg., consult. engrs. CD 10/21/43—ENR 10/28/43.

★**O., Toledo**—City, preliminary sketches made by C. Britsch, Nicholas Bldg., memorial auditorium for World War II, on north end Civil Center, **$2,500,000.** C. E. Hatch, Court House, city-county planning engr.

★**O., Toledo**—City, City Hall, preliminary sketches made by Britsch & Munger, Nicholas Bldg., office bldg. in Civic Center, **$1,250,000.** C. Hatch, Court House, city-county planning engr. CD 8/5/43—ENR 8/12/43.

★**O., Toledo**—Lucas Co., Court House, preliminary sketches made by Britsch & Munger, Nicholas Bldg., office bldg. **$1,250,000.** C. Hatch, Court House, city-county planning engr.

★**O., Toledo**—State Welfare Dpt., Columbus, plans by T. E. Brand, engr. and archt., Ohio Dpts. Bldg., Columbus, repairing present bldg., constructing medical and surgical hospital; men's infirmary for 190 patients; women's infirmary for 180 patients; storeroom addn.; residence for employees; 4 residences for doctors. Total cost **$1,700,000.**

Pa., Morrisville—School Bd., W. Taylor, secy., Legion Ave., plans 10% completed by M. J. Blew & Son, Otis Bldg., Phila., Pa., 2 story gymnasium, shop, classrooms, etc. bldg. Approx. **$150,000-$200,000.** Financing not provided.

★**Tenn., Nashville**—City, City Hall, plans by H. C. Hibbs, American Trust Bldg., Nashville, auditorium bldg. **$2,000,000.**

Tex., Crane—Bd. Educ., L. Martin, supt., Lubbock, plans by Haynes & Strange, 415 Myrick Bldg., Lubbock, brick, natural stone high school. **$350,000.**

Tex., Crane—Crane Co., c/o Judge, plans by Haynes & Strange, 415 Myrick Bldg., Lubbock, 2 story, brick, natural stone courthouse. **$150,000.** Bonds voted. CD 12/11.

Tex., Galena Park (br. Houston)—Galena Park School Bd., Galena Park (Houston), plans by Hedrick & Lindsley, 811 So. Standard Bldg., Houston, high school. **$300,000.**

★**Tex., Huntsville**—Sam Houston State Teachers College, Huntsville, plans 5% completed by H. D. Payne, 3455 Ella Lee Lane, Houston, boys' dormitory addn. **$150,000;** girls' dormitory wing, **$210,000;** 2 apartment bldg. units, **$150,000.**

★**Tex., San Antonio**—Bd. Educ., Lavaca and Water Sts., plans by Phelps & DeWees & Simmons, Majestic Bldg., expan., imprvs., rehabilitation 21 brick, concrete schools, **$740,000;** 2 story brick, concrete vocational school, Main Ave. Tech. bldg., **$200,000;** Lanier vocational school, **$200,000;** 6 brick, concrete Senior School bldgs., **$486,000.** Financing not provided.

Tex., Seminole—Bd. Educ., City Hall, plans by Haynes & Strange, 415 Myrick Bldg., Lubbock, high school. **$350,000.** Bond issue coming up.

★**Va., Lynchburg**—State, Richmond, plans by P. S. Clark, Lynchburg, C. O. Pearson, Radford, and S. S. Johnson, Lynchburg, assoc. archts., remodeling, fireproofing old bldgs., **$36,000;** addnl. farm bldg., **$6,000;** hot water storage tank, **$3,500;** new sidewalks, **$20,000;** school and auditorium, **$198,250;** dormitory bldg. for epileptics, **$360,000;** dining hall and kitchen bldg., **$60,000;** employee dormitory bldg., **$35,000;** 2 staff residences, **$22,500;** boiler and stoker, **$20,000,** for Lynchburg State Colony. Wiley & Wilson, Lynchburg, engrs. F. Q. Saunders, ch. engr. OIE, Bd. Corrections Bldg., Richmond, state consult. engr. CD 10/19—ENR 11/2.

Va., Marion—State, Richmond, plans by Ubank & Caldwell, Roanoke, reception bldg., **$173,284,** slaughterhouse and poultry barn **$9,500,** completing auditorium **$10,000,** laundry equip. **$6,000,** receiving home and medical center **$100,000,** cafeteria and kitchen equip. **$30,000,** laundry equip. **$33,300,** refrigeration for morgue and therapeutic and diagnostic fixtures **$6,800,** refrigeration and pasteurization equip. **$22,000,** power and light sys. **$5,000,** rewiring Davis Clinic **$5,000,** imprv. power and light sys. **$83,610.** Wiley & Wilson, Lynchburg, engrs., for Southwestern State Hospital. Funds appropriated. F. Q. Saunders, ch. engr. OIE, Bd. Corrections Bldg., Richmond, state consult. engr. CD 10/19—ENR 11/2.

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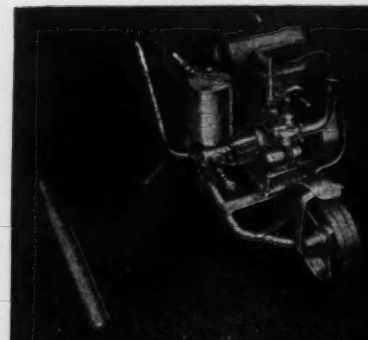

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POSTWAR PROJECTS (Cont'd.)

★**Va., Petersburg**—State, Richmond, plans by M. C. Lee, princ. archt., 110 N. 7 Richmond, Hennett & Smith, assoc. archts., Lynchburg, new colony for 1,800, $200,000, F. Q. Saunders, ch. engr. O I E, Bd. Corrections Bldg., Richmond, state consult. engr., plans by Baskerville & Son, Central National Bank bldg., Richmond, criminal bldg., $192,500; remodeling, fireproofing, $30,000; brick wall around criminal bldg., $20,000; bldg. to house laundry equip., $30,000; tuberculosis treatment bldg., $120,000; employee dormitory bldg., $160,000 for Central State Hospital, Petersburg. CD 10/19—ENR 11/2.

★**Va., Staunton**—State, Richmond, plans by M. E. Wright, princ. archt., 1103 E. Main St., Richmond, and M. C. Lee, 110 N. 7 St., Richmond, and Collins, Craig & Hurt, Staunton, assoc. archts., new bldgs., and remodeling old bldgs., $947,000; reception bldg., $225,000; boiler plant bldg., $18,000; remodeling, fireproofing, $35,000; elevator, administration bldg., $10,000; equip., $15,000, for Western State Nospital, Staunton, F. Q. Saunders, ch. engr. OIE, Bd. Corrections Bldg., Richmond, state consult. engr. CD 10/19—ENR 11/2.

★**Va., Williamsburg**—State, Richmond, plans by R. Cook and Van Leeuwen, Arcade Bldg., Norfolk, rebuilding institution to accommodate 1,600 patients, administration bldg., receiving and hospital bldgs., dormitories, auditorium and recreation bldg., dining and kitchen bldg., hospital bldgs., dormitories, storehouses, garage, shop, laundry, employee housing, for Eastern State Hospital, at Dunbar Farm, near here. $3,252,906. L. Schultze & Assoc., 18 E. 48 St., New York, N. Y., consult. engrs. CD 10/16—ENR 11/2.

★**Wash., Everett**—School Dist. 2, Colby Ave. and 23 St., O. Johnson, secy. School Bd., plans by W. A. Johnson, First National Bank Bldg., school. $600,000, first unit of $1,000,000 modernization program. Bonds voted. CD 10/11—ENR 10/19.

READY FOR BIDS

Ky., Owensboro—City, City Hall, E. Smith, supt. Pub. Utilities, plans completed fly ash expirator to collect fly ash from stack. $40,000. Black & Veatch, 1706 Bway., Kansas City, Mo., consult. engrs.

COMMERCIAL BUILDINGS

PROPOSED WORK

Conn., Danbury—J. A. Linsky, 209 Main St., small frame homes, residential development, Terryville Knolls, Candlewood Lake Section. $150,000.

Conn., Fairfield—Eleazar Parmly, Jr., 41 Valley Rd., homes, Churchill and Valley Rds., incl. private road. $150,000.

La., New Orleans—The Mercy Hospital, c/o Sister M. Laura, 1321 Anunciation St., hospital. Over $250,000.

Me., Portland—Roman Catholic Diocese of Portland, c/o F. W. Sullivan, 477 Congress St., high school, Free St. Over $150,000. Financing not provided.

Me., Portland—Sears, Roebuck Co., 201 Brookline Ave., Boston, Mass., store, warehouse, Oak and Free Sts. Over $150,000. Financing not provided.

N. J., Jersey City—Young Mens Christian Assn., 350-5 Ave., New York, N. Y., youth center bldg., incl. gymnasium, swimming pool and dormitories, Jackson Ave. area. $150,000.

R. I., Pawtucket—St. Matthews Evangelical Church, F. W. Thomas, 93 Greene St., 1 story, bsmnt., brick, steel church. $150,000.

R. I., Providence—Providence College, River Ave., brick, concrete, stone gymnasium bldg. $350,000. Financing not provided.

★**R. I., Woonsocket**—Woonsocket Hospital Corp., 115 Cass Ave., brick, steel addnl. hospital units. $500,000.

★**Tex., Corpus Christi**—S. E. Wilson, Driscoll Bldg., purchased 14,000 acre island, mouth of Corpus Christi Bay, near here, and plans hotel and other bldgs. required for 1st class resort, pavilion, recreation and dance hall, water sys., sanitary and storm sewers, road and street sys., grounds development, incl. bathing beach, facilities, boating docks, golf course, athletic courts, etc. Total cost over $600,000.

Tex., San Antonio—N. S. Dickinson & Co., 122 Donaldson St., 50 dwellings. $300,000.

★**Tex., San Antonio**—L. E. Fite & Co., 1001 Donaldson St., 200 dwellings. $1,000,000.

Wis., Waukesha—Carroll College, Waukesha, rehabilitate college bldgs. $150,000.

PLANS UNDER WAY

★**Ala., Birmingham**—Crippled Children's Clinic, 2430 11 Ave. N., plans completed by Warren, Knight & Davis, Protective Life Insurance Bldg., clinic, $500,000. Financing not provided.

★**Ala., Birmingham**—Montgomery Real Estate & Insurance Co., 528 N. 20 St., plans 75% completed by G. P. Turner, 1221 Martin Bldg., one hundred 1 story frame residences. $500,000.

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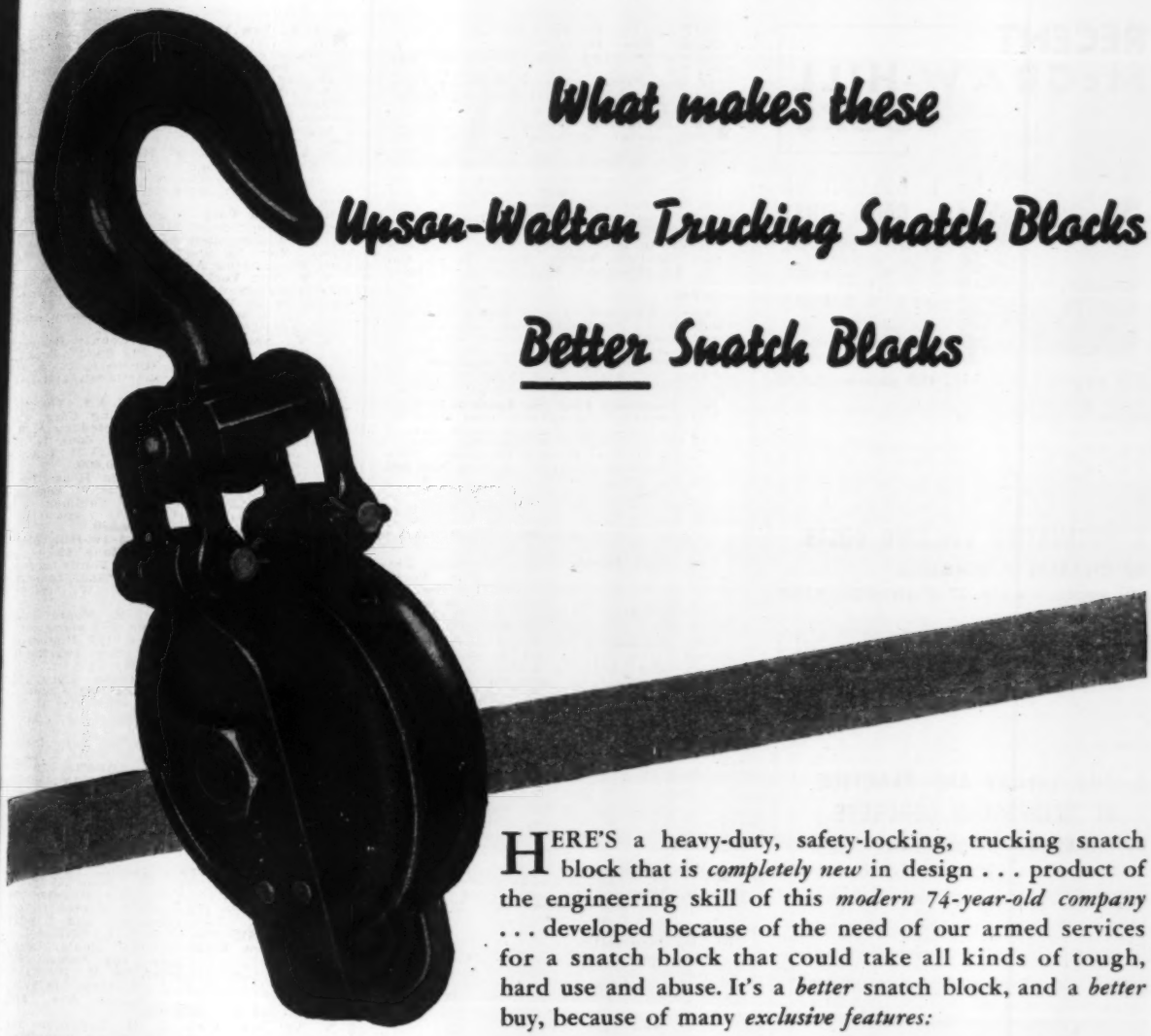

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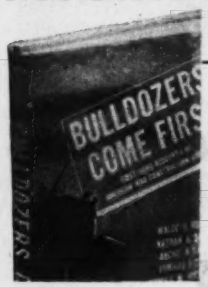

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4. BLUEPRINT READING FOR THE BUILDING TRADES

By JOSEPH E. KENNEY

100 pages, 8½ x 11, illustrated, $2.00

This book explains what blueprints are, their importance, how the architect prepares working drawings, who uses them, and how to learn to read them. It shows the meaning and use of the various symbols and conventions and how they fit into the working drawings for an entire building. There is material on first, second, and third class construction; the use of the scale; question and answer problems; plans, specifications and details of small houses for practice work; and a complete glossary of architectural and building terms.

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POSTWAR PROJECTS (Cont'd.)

Conn., New Haven—Jewish Home for Aged, J. Abrams, 667 Davenport Ave., plans by R. W. Foote, 157 Church St., 5 story, brick, steel, concrete dormitory addn., library, storage and refrigerating departments. **$373,000.**

★**Mass., Boston**—Boston University, 688 Boylston St., sketches by Cram & Ferguson, 248 Boylston St., College of Liberal Arts. Over **$500,000.** Financing not provided.

Mass., Northampton—Trustees Smith College, Northampton, sketches by K. S. Putnam, 176 South St., concrete, brick, stone chapel. Approx. **$150,000.** Financing not provided.

Mass., Quincy—Quincy Point Congregational Church, Quincy, plans by C. Collens, 71 Newbury St., Boston, 1 story, bsmnt., brick, stone church, Quincy Point, **$150,000.**

Mass., Westfield—Young Men's Christian Assn., H. T. Dougherty, secy., 105 Elm St., plans completed by J. William Beal Sons, 185 Devonshire St., Boston, 2 story, bsmnt. community unit, Court St. **$275,000.** Financing not provided. $125,000 balance being raised. CD 10/28/43—ENR 11/18/43.

Mo., University City (St. Louis 5, P. O.)—B'Nai Ameena Congregation, 6830 Washington Ave., University City, St. Louis, Zone 5, plans by B. Shapiro, Wainwright Bldg., 7 and Chestnut Sts., Zone 1, synagogue, Trinity and Washington Aves. Approx. **$350,000.** Financing not provided.

N. Y., Troy—Russell Sage College, Troy, sketches by Leland & Larson, 814 State Bldg., Boston, Mass., recreation bldg., swimming pool. Over **$200,000.** Financing not provided.

Tex., Fort Worth—Texas Christian University, M. E. Sodler, pres., Fort Worth, plans by W. G. Clarkson Co., 1st National Bank Bldg., 4 story, bsmnt., brick science bldg. **$450,000.** Campaign for funds now under way. CD 10/16—ENR 11/2.

Tex., Odessa—J. W. Perry & O. Canon, Odessa, plans by Haynes & Strange, 415 Myrick Bldg., Lubbock, 8 story, brick, steel, rein.-con. office bldg. **$400,000.**

Tex., Seminole — F. Childers, Seminole, plans 25% completed by Haynes & Strange, 415 Myrick Bldg., Lubbock, 4 story, hotel. **$150,000.**

Tex., Waco—Baylor University, Waco, plans by G. A. Carlander, Amarillo, Tidwell Memorial bldg. **$225,000.** CD 4/10—ENR 4/20.

Va., Richmond — St. Paul's Catholic Church, 2809 North Ave., plans under way church, Chamberlayne Ave. and Rennie St. **$200,000.**

★**Wis., Milwaukee**—Felician Sisters, 3249 S. 18 St., Zone 7, plans by F. S. Gurda, 733 W. Mitchell St., Zone 4, 5 and 6 story, bsmnt. hospital. **$500,000.** CD 5/17—ENR 6/1.

READY FOR BIDS

Colo., Denver—Presbyterian Hospital, E. 19 and Gilpin Sts., plans completed by Fisher & Fisher, Denver National Bldg., 3 story, brick, stone nurses home. CD 3/24—ENR 4/6.

N. Y., New York—Benenson Realty Corp., 475 Fifth Ave., Zone 17, plans completed H. I. Feldman, 415 Lexington Ave., Zone 17, 8 story apartment, 250 W. 23 St. **$200,000.**

N. Y., New York—Clayton Realty Corp., 765 Carter Ave., Zone 57, plans completed H. Ginsbern, 205 E. 42 St., Zone 17, 10 story apartment. 212-214 E. 178 St. **$250,000.**

★**N. Y., New York**—Coleman Holding Corp., 118 W. 57 St., plans completed by L. Ordwein, 106 E. 81 St., 19 story, 125x200 ft., apartment, 6 Ave. from 25 to 26 Sts. **$900,000.**

★**N. Y., New York**—Coleman Holding Corp., 118 W. 57 St., Zone 19, plans completed by L. E. Ordwein, 106 E. 81 St., Zone 28, 11 story, apartment, 52-56 W. 36 St., **$200,000;** 12 story apartment, 19-21 W. 56 St., **$175,000;** 10 story, apartment, 125 W. 56 St., **$145,000.**

★**N. Y., New York**—Consolidated Biological Products, Inc., Woodmere, plans completed by Emery Roth & Sons, 18 E. 48 St., Zone 17, 45 story office and mfg. bldg., 109-31 W. 50 St. **$4,750,000.**

N. Y., New York—Frederick Dedona, 1067 Olmstead Ave., Zone 61, plans completed by Wm. I. Hohauser, 1841 Bway., Zone 23, 6 story apartment, Olmstead Ave. and Blockrock Ave. **$150,000.**

N. Y., New York—Estate of Alfred Servida, 105 Rockwood St., Zone 62, plans completed by R. Epstein, 18 W. 27 St., Zone 1, 6 story, 98x160 ft. apartment, Rockwood St. and Walton Ave. **$155,000.**

N. Y., New York—50 St. Corp. and 6th Ave. Corp., 505 5 Ave., Zone 17, plans completed by Moore & Landsiedel, 509 Welles Ave., Zone 55, 5 story addn. for office space, at 1261-79 6th Ave. **$200,000.**

★**N. Y., New York**—Goelet Amsterdam Corp., H. Goelet, pres., 292 Madison Ave., Zone 17, plans completed by H. L. Young, 305 Bway., Zone 7, 19 story apartment, 449-455 Amsterdam Ave. **$1,000,000.**

★**N. Y., New York**—Goelet Columbus Corp., H. Goelet, pres., 292 Madison Ave., Zone 17, plans completed by H. L. Young, 305 Bway., Zone 7, 19 story apartment, 569-577 Columbus Ave. **$1,000,000.**

N. Y., New York—H. M. J. Holding Corp. H. Minners, pres., 71 W. 23 St., plans completed H. Ginsbern, 205 E. 42 St., Zone 17, 6 story apartment, 111-115 E. 24 St. **$150,000.**

N. Y., New York—M. Halpern, 124 E. 196 St., New York, Zone 58, plans completed by L. Stillman, 705 Gerard Ave., Zone 51, 6 story apartment, Anthony Ave. and 181 St. **$150,000.**

N. Y., New York—High View Apartments, Inc., S. Strom, pres., 340 Riverside Dr., Zone 25, plans completed by H. H. Lillien, 2095 Bway., Zone 23, 6 story apartment, 692-700 Fort Washington Ave. **$400,000.**

N. Y., New York—Robert Hoe Estates Co., 1370 Bway., New York, Zone 18, plans completed by J. W. O'Connor, 162 E. 37 St., Zone 16, 4 story addn. to 16 story office bldg., 1364-70 Bway. **$250,000.**

N. Y., New York—Inter-County Realties, Inc., G. Weisbrod, pres., 305 Bway. Zone 7, plans completed by H. Ginsbern, 205 E. 42 St., Zone 17, 10 story apartment, 1181-1183 Second Ave. **$200,000.**

★**N. Y., New York** — L.A.S. Theatres Corp. and Fortieth Holding Corp., 625 8 Ave., Zone 18, plans completed by A. E. Knappe, 192 Lexington Ave., Zone 16, 35 story office and showroom, 623-31 8 Ave. and 363-67 W. 40 St. **$1,750,000.**

N. Y., New York—Lexington House, Inc., I. Broff, pres., 120 Central Park S., Zone 19, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 12 story apartment, 677-679 Lexington Ave. **$190,000.**

★**N. Y., New York**—McGraw-Hill Bldg. Corp., 330 W. 42 St., Zone 18, plans completed by Harrison, Fouilhoux & Abromovitz, 45 Rockefeller Plaza, Zone 20, 24 story office bldg., 346 W. 42 St. **$2,000,000.**

N. Y., New York—Wm. M. Moore Bldg. Corp., 74 W. 109 St., Zone 25, plans completed by O. I. Silverstone, 153 Pierrepont St., Brooklyn, Zone 2, 9 story apartment, 1356-1362 York Ave. **$300,000.**

★**N. Y., New York**—Moxon Corp., M. Lehman, pres., 31 Nassau St., Zone 5, plans completed by S. I. Schwartz, 15 W. 44 St., Zone 18, 22 story office bldg., 1452-60 Bway. **$1,575,000.**

★**N. Y., New York**—Mutual Life Insurance Co., 34 Nassau St., Zone 5, plans completed by Walker & Gillette, 19 E. 53 St., Zone 22, 3 story bank bldg., 508-14 Fifth Ave. **$1,000,000.**

★**N. Y., New York**—N.Y.S. Realty & Terminal Co., 466 Lexington Ave., Zone 17, plans completed by J. P. Gallagher, c/o owner, 34 story office bldg., 270 Park Ave. **$11,500,000.**

N. Y., New York—National Sugar Refining Co., 129 Front St., Zone 5, plans completed by James Gamble Rogers, 156 E. 46 St., Zone 17, 6 story, 84x108 ft. office bldg., 100-104 Wall St. and 120-126 Front St. **$450,000.** CD 8/16—ENR 9/7.

N. Y., New York—Nomark Realty Corp., M. Kavenoff, vice pres., 154 Nassau St., Zone 17, plans completed by M. Wechsler, 103 Park Ave., Zone 17, 6 story, 74x99 ft., apartment, 741-743 Columbus Ave., and 71-75 W. 96 St., **$150,000.**

N. Y., New York—T. H. Reynolds, 992 Anderson Ave., Zone 52, plans completed by L. I. Phyfe, 1001 Anderson Ave., Zone 52, 6 story apartment, Anderson Ave. near Jerome Ave. **$420,000.**

N. Y., New York—Rose E. Schmidt, 2750 Webb Ave., Zone 63, plans completed by H. Ginsbern, 205 E. 42 St., Zone 17, 6 story, apartment, 195 St. and Webb Ave. **$150,000.**

N. Y., New York—T. S. Tenney, 535 Fifth Ave., Zone 17, plans completed 12 story, 50 x 80 ft. apartment, 47-49 King St. **$250,000.**

N. Y., New York—2030 Anthony Ave. Corp., S. Alkoff pres., 400 E. Fordham Rd., Zone 58, plans completed H. B. Rutkins, 400 E. Fordham Rd., Zone 58, 6 story apartment., Burnside Ave. East and Valentine Ave. **$150,000.**

★**N. Y., New York** — Wilber Associates, 1017 Intervale Ave., Zone 59, plans completed by H. Ginsbern, 205 E. 42 St., Zone 17, two 6 story apartments, 1 at 161 St. near Sheridan Ave., **$250,000;** other at 162 St., near Sheridan Ave., **$250,000.**

N. Y., New York—Winland Realty Corp., 600 W. 173 St., Zone 32, plans completed by H. H. Lillien, 2095 Bway., Zone 23, 6 story, 133x161 ft. apartment, 167 St. and College Ave. **$150,000.**

CONTRACTS AWARDED

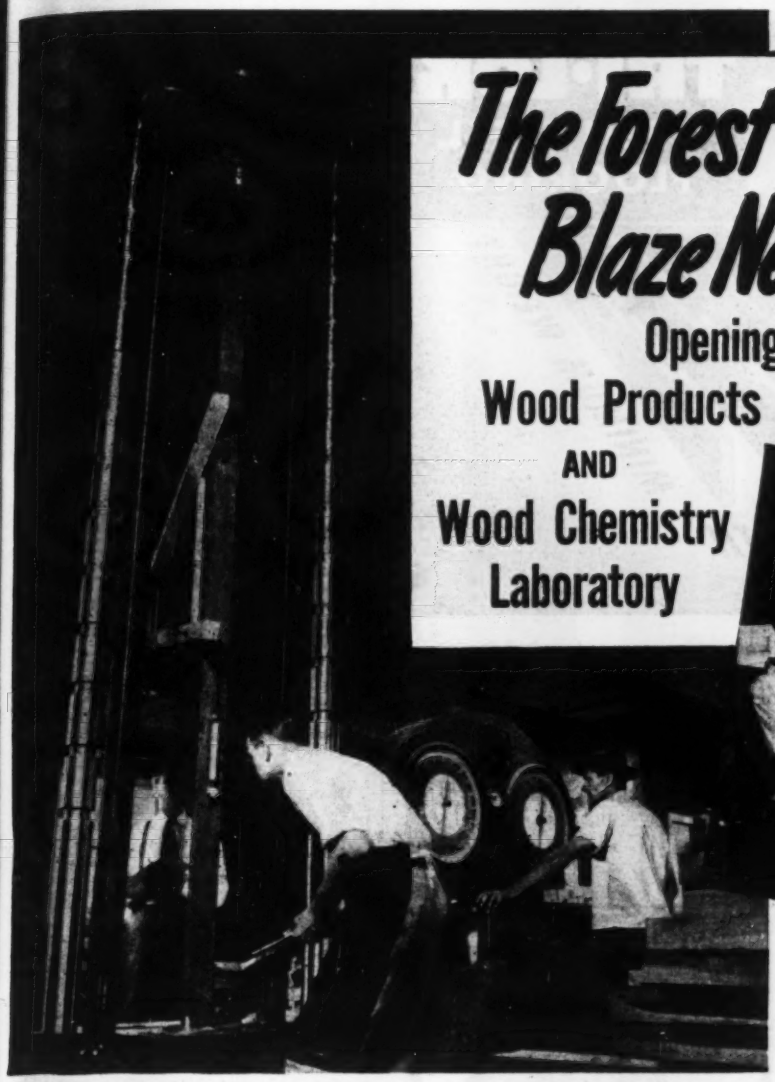
★**N. Y., Mount Vernon**—Syndicate, A. Morell, pres., Colonial Village, Gramatan and Hayward Aves., two 6 story, apartments, Collins Ave. between Birch St. and Fleetwood Ave. **$800,000.** Owner Builds. R. Candela, 110 E. 42 St., New York, Zone 17, archt.

PROJECTS CANCELLED.

Tex., San Antonio—National Hotel Co., Anico Bldg., Galveston, project cancelled, work now going ahead hotel on site now occupied by Menger Hotel. Over **$150,000.** A. S. Fraser, 624 American National Insurance Bldg., Galveston, archts. CD 7/29—ENR 8/10.

The Forest Industries Blaze New Trails

Opening of TECO Wood Products Development Shop AND Wood Chemistry Laboratory



TECO Chemistry Laboratory. TECO chemists are here shown working on lignin derivatives.

200,000 lb. Baldwin-Southwark testing machine in the TECO Shop. Material undergoing test is a small wood column being tested in compression.

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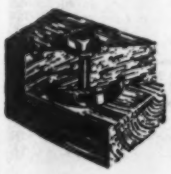

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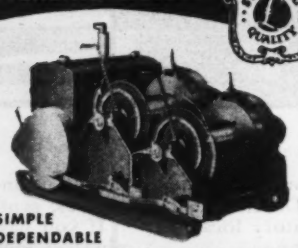

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POSTWAR PROJECTS (Cont'd.)

Que., Quebec City—Metropolitan Stores, Ltd., 136 Dundas Street, London, project cancelled, now going ahead, departmental store, St. John St. $150,000.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Mass., Pittsfield—PLANT—Berkshire-Coat Co., Curtis St. mfg. bldg. Over $40,000. Legal obstacles to be overcome.

★**N. J., Camden**—PLANT—Supplee-Wills-Jones Milk Co., 1523 N. 26 St., Phila., Pa., enlarging plant, new general office bldg. 3 and Market Sts. $1,000,000.

N. J., Summit—PLANT—Aircraft Parts Development Corp., 409 Broad St., plant. $45,000.

N. Y., Buffalo—PLANT—Hinde & Dauch Paper Co., W. F. Pfieffer, secy.-treas., Sandusky, plant addn., in rear of present plant. $150,000 or more. Site purchased.

Pa., Harrisburg—PLANT—Hershey Creamery Co., A. B. Holder, pres., addnl. alterations, general remodeling ice cream mfg. plant. $150,000.

Pa., Phila.—PLANT—H. Brinton Co., 3700 Kensington Ave., knitting machinery plant. Site purchased.

★**Pa., Phila.** — PLANT — Supplee-Wills-Jones Milk Co., 1523 N. 26 St., milk processing and distributing plant, Tabor Rd and Harrison St., $2,000,000.

★**Tenn., Nashville** — PLANT — Nashville Electric Service, 605 Church St., central service bldg., etc. $600,000.

Tex., Houston — WAREHOUSE, etc. — M. Kroot, 1601 W. Webster St., modernizing 1 story, brick warehouse and mfg. plant. $100,000. Property purchased.

Tex., Port Arthur — PLANT — Jefferson Chemical Co., Port Arthur, subsidiary of Texas Co., and American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., constructing, equipping plant. Over $150,000.

Washington — MINE DEVELOPMENT — St. Eugene Mining Corp., c/o Ventures, Ltd., 25 W. King St., Toronto, Ont., Lone Star mine development, Ferry Co. $80,000.

Wash., Seattle — WAREHOUSE — Seattle Hardware Co., 501 1 Ave. S, warehouse. Over $40,000.

PLANS UNDER WAY

★**Mass., Springfield** — GARAGE — Springfield Street Railway Co., 2257 Main St., sketches by R. F. Dressler, 11 South La Salle St., Chicago, Ill., concrete, brick, steel bus garage. $600,000. Financing not provided. CD 3/31—ENR 4/20.

Mass., Whitinsville—LAUNDRY—Owner, c/o E. V. Aldrich, archt., 46 Lincoln St., Hudson, sketches brick, concrete laundry bldg. addn. $40,000 with equip. Financing not provided.

Mo., St. Louis—SERVICE AND SALES—E. H. Woestendick, et al, c/o Hampton Electric Co., 5825 Hampton Ave., Zone 9, plans by Saum Architects, 713½ Chestnut St., Zone 1, 1 and 2 story, brick, terra cotta service and sales bldg., plane repair department. $75,000. Site purchased.

N. H., Manchester—PLANT—General Ice Cream Corp., 301 Granite St., plans 50% completed by N. N. Corey, 875 Elm St., 2 story, 65x70 ft., brick, steel plant addn., alterations. $43,000. Financing not provided.

N. J., Hanover—LABORATORY—Owner, c/o V. M. Reynal, archt., 360 Main St., East Orange, plans under way 2 story, brick pharmaceutical laboratory. $50,000.

Tex., Houston—WAREHOUSE—Houston Natural Gas Corp., Petroleum Bldg., plans 50% completed by B. P. Briscoe, 3901 Travis St., masonry and steel warehouse, Lockwood Dr. $125,000. CD 11/10—ENR 11/16 under Industrial Bldgs.

Tex., Lubbock—GARAGE, etc.—Dickinson Motor Co., Lubbock, plans 15% completed by J. A. Pitzinger, S.W. Life Bldg., Dallas, 130x324 ft. garage (repair shop), $70,000; 60x100 ft. servicing shop bldg., $40,000; 60x126 ft., used car storage bldg., $45,000.

READY FOR BIDS

★**N. Y., New York**—FACTORY—J. I. Goldenberg, 224 W. 30 St., Zone 1, plans completed by W. J. Minogue, 17 E. 42 St., Zone 17, 20 story factory, showroom and office bldg., 5 Ave. and 30 St. $2,000,000.

N. Y., New York—WAREHOUSE, etc.—A. Sancillio, 276 5th Ave., Zone 1, plans completed by S. L. Strauss, 70 E. 45 St., Zone 15, 1 story warehouse and office, 436-40 W. 31 St. $40,000.

N. Y., New York—FACTORY—J. Smith, c/o J. M. Felson, archt., 250 W. 57 St., Zone 19, plans completed 6 story factory, 527-531 W. 34 St., through to 530-532 W. 35 St. $250,000.

UNCLASSIFIED

PROPOSED WORK

Ariz., Ashford—AIRPORT—Town, airport grading, paving, lighting. $168,100. CAA will help finance.

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POSTWAR PROJECTS (Cont'd.)

Ariz., Benson and Tombstone—AIRPORT—Cities airport grading, etc. **$32,180.** CAA will help finance.

★**Ariz., Flagstaff**—AIRPORT—City, airport grading, paving, lighting, etc. **$762,040.** CAA will help finance.

Ariz., Payson—AIRPORT—Town, airport grading, paving, lighting, etc. **$274,230.** CAA will help finance.

★**Ariz., Phoenix**—AIRPORT—City, airport grading, paving, lighting, etc. **$759,470.** CAA will help finance.

★**Ariz., St. Johns-Springer**—AIRPORT—Towns, airport grading, paving, lighting, etc. **$533,470.** CAA will help finance.

Ariz., Sanders—AIRPORT—Town, airport grading, paving, lighting. **$162,000.** CAA will help finance.

Ariz., Tucson—AIRPORT—City, City Hall, airport grading, paving, lighting, etc. **$208,970.** CAA will help finance.

★**Ariz., Williams** — AIRPORT — City, airport grading, paving lighting, etc. **$532,970.** CAA will help finance.

Ariz., Window Rock — AIRPORT — Town, airport grading, paving, lighting, etc. **$293,900.** CAA will help finance.

★**Ark., Arkadelphia** — AIRPORT — City, airport grading, paving, lighting, etc. **$671,790.** CAA will help finance.

★**Ark., Batesville**—AIRPORT—City, airport grading, paving, lighting. **$714,472.** CAA will help finance.

★**Ark., Benton-Bauxite**—AIRPORT—Cities, airport grading, paving, lighting, etc. **$961,531.** CAA will help finance.

★**Ark., Bentonville** — AIRPORT — Town, airport grading, paving, lighting, etc. **$789,060.** CAA will help finance.

★**Ark., Booneville** — AIRPORT — City airport grading, paving lighting, etc. **$788,271.** CAA will help finance.

★**Ark., Brinkley**—AIRPORT—Town, airport grading, paving, lighting, etc. **$674,540.** CAA will help finance.

★**Ark., Clarksville**—AIRPORT—City, airport grading, paving, lighting, etc. **$669,690.** CAA will help finance.

★**Ark., Conway**—AIRPORT—Town, airport grading, paving, lighting, etc. **$679,230.** CAA will help finance.

★**Ark., Cotter** — AIRPORT — Town airport grading, paving, lighting, etc. at Cotter Mountain. **$699,880.** CAA will help finance.

★**Ark., Crossett**—AIRPORT—City, airport grading, paving, lighting, etc. **$864,520.** CAA will help finance.

★**Ark., De Queen**—AIRPORT—Town airport grading, paving, lighting, etc. **$776,171.** CAA will help finance.

Ark., Dewitt — AIRPORT — Town, airport grading, paving, lighting, etc. **$143,000.** CAA will help finance.

★**Ark., El Dorado**—AIRPORT—City, airport grading, paving, lighting, etc. **$545,827.** CAA will help finance.

★**Ark., Fayetteville**—AIRPORT—City, airport grading, paving, lighting, etc. **$1,151,110.** CAA will help finance.

★**Ark., Fordyce** — AIRPORT — Town, airport grading, paving, lighting, etc. **$707,180.** CAA will help finance.

★**Ark., Forrest City** — AIRPORT — Town, airport grading, paving, lighting, etc. **$687,420.** CAA will help finance.

★**Ark., Fort Smith**—AIRPORT—City, airport grading, paving, lighting, etc. **$1,111,945.** CAA will help finance.

★**Ark., Harrison**—AIRPORT—Town, airport grading, paving, lighting, etc. **$624,853.** CAA will help finance.

★**Ark., Helena-West Helena**—AIRPORT—Cities, airport grading, paving, lighting. **$864,500.** CAA will help finance.

★**Ark., Hot Springs**—AIRPORT—City, airport grading, paving, lighting, etc. **$519,577.** CAA will help finance.

★**Ark., Jonesboro** — AIRPORT — City, airport grading, paving, lighting, etc. **$534,391.** CAA will help finance.

★**Ark., Little Rock**—AIRPORT—City, airport grading, paving, lighting, etc. **$833,110.** CAA will help finance.

★**Ark., Magnolia**—AIRPORT—City, airport grading, paving, lighting, etc. **$642,380.** CAA will help finance.

★**Ark., Malvern**—AIRPORT—Town, airport grading, paving, lighting, etc. **$760,771.** CAA will help finance.

★**Ark., Marianna**—AIRPORT—Town, airport grading, paving, lighting, etc. **$667,049.** CAA will help finance.

★**Ark., McGeehee-Dermott** — AIRPORT — Cities, airport paving, grading, lighting, etc. **$707,310.** CAA will help finance.

★**Ark., Mena**—AIRPORT—Town, airport grading, paving, lighting, etc. **$793,540.** CAA will help finance.

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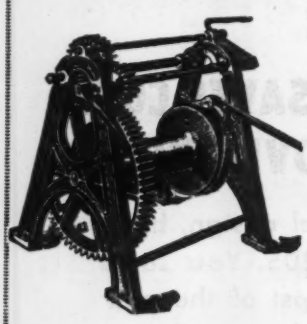

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POSTWAR PROJECTS (Cont'd.)

★**Ark., Monticello** — AIRPORT — City, airport grading, paving, lighting, etc. $710,567. CAA will help finance.

★**Ark., North Little Rock**—AIRPORT—City, airport grading, paving, lighting, etc. $767,780. CAA will help finance.

★**Ark., Paragould**—AIRPORT—City, airport grading, paving, lighting, etc. $640,989. CAA will help finance.

★**Ark., Paris** — AIRPORT — City, airport grading, paving, lighting, etc. $633,804. CAA will help finance.

★**Ark., Pine Bluff**—AIRPORT—City, airport grading, paving, lighting, etc. $1,388,670. CAA will help finance.

Ark., Pocahontas—AIRPORT—Town, airport grading, paving, lighting, etc. $71,995. CAA will help finance.

★**Ark., Prescott**—AIRPORT—Town, airport grading, paving, lighting, etc. $547,920. CAA will help finance.

★**Ark., Russellville**—AIRPORT—Town, airport grading, paving, lighting, etc. $658,819. CAA will help finance.

★**Ark., Searcy**—AIRPORT—Town, airport grading, paving, lighting, etc. $767,151. CAA will help finance.

★**Ark., Texarkana**—AIRPORT—City, airport grading, paving, lighting, etc. $1,058,783. CAA will help finance.

★**Ark., Van Buren**—AIRPORT—City, airport grading, paving, lighting, etc. $644,340. CAA will help finance.

★**Ark., Wynne**—AIRPORT—Town, airport grading, paving, lighting, etc. $770,591. CAA will help finance.

★**Calif., Alhambra**—AIRPORT—City, airport grading, paving, lighting, etc. $831,000. CAA will help finance.

★**Calif., Alturas**—AIRPORT—City, airport grading, paving, lighting, etc. $928,500. CAA will help finance.

★**Calif., Anaheim**—AIRPORT—City, airport grading, paving, lighting, etc. $1,063,200. CAA will help finance.

★**Calif., Avalon**—AIRPORT—Town, airport grading, paving, lighting, etc. $523,000. CAA will help finance.

★**Calif., Berkeley**—AIRPORT—City, airport grading, paving, lighting, etc. $11,514,430. CAA will help finance.

★**Calif., Compton**—AIRPORT—City, airport grading, paving, lighting, etc. $699,000. CAA will help finance.

Calif., Long Beach—AIRPORT—City, airport grading, paving, lighting, etc. $402,000. CAA will help finance.

★**Calif., Long Beach**—RUNWAYS, etc.—Dpt., Aeronautics, E. A. Lloyd, supt., 3365 Lakewood Blvd., Zone 8, acquired 425 acres east of Lakewood Blvd., extending runways, drainage, sanitary sewers, storm drains, grading, paving, field and runway lighting underpass for Lakewood Blvd., administration bld. addn. $7,100,000. Financing not provided.

★**Calif., Oakland**—AIRPORT—City, airport grading, paving, lighting, etc. $2,850,000. CAA will help finance.

★**Calif., San Bernardino**—AIRPORT—City, airport grading, paving, lighting, etc. $615,500. CAA will help finance.

★**Calif., San Diego**—AIRPORT—City, airport grading, paving, lighting, etc. $1,998,500. CAA will help finance.

★**Calif., Santa Monica**—AIRPORT—City, airport grading, paving, lighting. $1,007,000. CAA will help finance.

★**Calif., Stockton**—AIRPORT—City, airport grading, paving, lighting, etc. $652,000. CAA will help finance.

★**Colo., Denver**—AIRPORT—City, airport grading, paving, lighting, etc. $2,060,000. CAA will help finance.

★**Colo., Greeley**—AIRPORT—City, airport grading, paving, lighting, etc. $515,000. CAA will help finance.

★**Conn., Ansonia-Derby** — AIRPORT — Cities, airport grading, paving, lighting, etc. $553,000. CAA will help finance.

★**Conn., Clinton**—AIRPORT—City, airport grading, paving, lighting, etc. $553,000. CAA will help finance.

★**Conn., Danielson**—AIRPORT—Town, airport grading, paving, lighting, etc. $963,000. CAA will help finance.

★**Conn., Fairfield**—AIRPORT—City, airport grading, paving, lighting, etc. $553,000. CAA will help provide.

★**Conn., Greenwich**—AIRPORT—City, airport grading, paving, lighting, etc. $606,000. CAA will help finance.

★**Conn., Milford**—AIRPORT—City, airport grading, paving, lighting, etc. $825,000. CAA will help finance.

★**Conn., New Britain** — AIRPORT — City, airport grading, paving, lighting, etc. $553,000. CAA will help finance.

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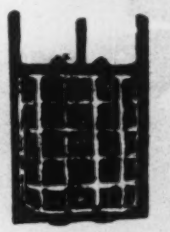

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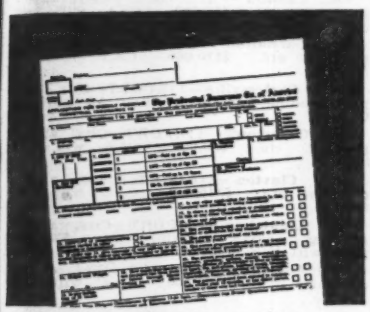

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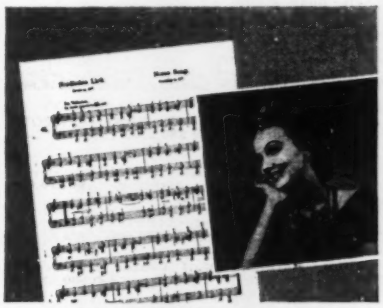

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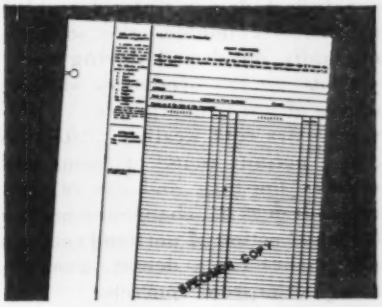

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POSTWAR PROJECTS (Cont'd.)

★**Conn., New Haven**—AIRPORT—City, airport grading, paving, lighting, etc. **$597,000.** CAA will help finance.

★**Conn., Norwich**—AIRPORT—City, airport grading, paving, lighting, etc. **$553,000.** CAA will help finance.

★**Conn., Putnam**—AIRPORT—City, airport grading, paving, lighting, etc. **$624,000.** CAA will help finance.

★**Conn., Rockville**—AIRPORT—City, airport grading, paving, lighting, etc. **$553,000.** CAA will help finance.

★**Conn., Thompsonville** — AIRPORT—City, airport grading, paving, lighting, etc. **$553,000.** CAA will help finance.

★**Conn., Waterbury**—AIRPORT—City, airport grading, paving, lighting, ect. **$1,395,000.** CAA will help finance.

Conn., Willimantic—AIRPORT—City, airport grading, paving, lighting, etc. **$403,000.** CAA will help finance.

Conn., Windsor Locks — AIRPORT — City, airport lighting, etc. **$76,000.** CAA will help finance.

Del., Bellefronte (Mail Wilmington)—AIRPORT—City, airport grading, lighting, etc. **$40,000.** CAA will help finance.

★**Del., Rehoboth Beach**—AIRPORT—City, airport grading, paving, lighting, etc. **$625,000.** CAA will help finance.

Del., Smyrna — AIRPORT — City, airport grading, lighting, etc. **$40,000.** CAA will help finance.

★**Fla., Belle Glade**—AIRPORT—City, airport grading, paving. **$573,000.** CAA will help finance.

★**Fla., Clewiston** — AIRPORT — City, airport grading, paving, lighting, etc. **$569,000.** CAA will help finance.

★**Fla., Crestview**—AIRPORT—City, airport grading, paving, lighting, etc. **$548,000.** CAA will help finance.

★**Fla., De Funiak Springs**—AIRPORT—City, airport grading, paving, lighting, etc. **$543,750.** CAA will help finance.

★**Fla., Jacksonville**—AIRPORT—City, airport grading, paving, lighting. **$915,300.** CAA will help finance.

Fla., Jewell (Mail Vilas)—AIRPORT—City, airport grading. **$80,550.** CAA will help finance.

Fla., Lakeland—AIRPORT—City, airport grading, paving, lighting, **$360,700.** CAA will help finance.

Fla., Lake Wales—AIRPORT—City, airport grading, paving, **$172,300.** CAA will help finance.

Fla., Lantana—AIRPORT—City, airport grading, paving, lighting, etc. **$256,800.** CAA will help finance.

Fla., Layton (Mail Lake Bird)—AIRPORT—City, airport grading **$80,550.** CAA will help finance.

★**Fla., Quincy** — AIRPORT — City, airport grading, paving, lighting. **$1,210,000.** CAA will help finance.

Fla., River Junction—AIRPORT—City, airport grading, paving. **$335,000.** CAA will help finance.

Fla., Rutland (Mail Center Hill)—AIRPORT—City, airport grading. **$50,000.** CAA will help finance.

Fla., Sarasota — AIRPORT — City, airport grading, paving, lighting. **$276,200.** CAA will help finance.

Fla., Sebring — AIRPORT — City, airport grading, paving. **$353,500.** CAA will help finance.

Fla., Sopchoppy—AIRPORT, City, airport grading. **$80,550.** CAA will help finance.

Fla., Starke — AIRPORT — City, airport grading. **$138,850.** CAA will help finance.

Fla., Tallahassee—AIRPORT—City, airport lighting. **$36,000.** CAA will help finance.

★**Fla., Tampa**—AIRPORT—City, airport grading, paving, lighting. **$606,600.** CAA will help finance.

Fla., Tarpon Springs — AIRPORT — City, airport grading, paving. **$335,000.** CAA will help finance.

Fla., Tavernier—AIRPORT—City, airport grading, paving, lighting. **$328,550.** CAA will help finance.

Fla., Taylor (Mail Moniac, Ga.)—AIRPORT—City, airport grading. **$91,050.** CAA will help finance.

Fla., Tenile (Mail Bay Spring)—AIRPORT—City, airport grading. **$91,050.** CAA will help finance.

Fla., Titusville-Cocoa—AIRPORT—Cities, airport lighting. **$36,000.** CAA will help finance.

Fla., Trenton — AIRPORT — City, airport grading. **$156,350.** CAA will help finance.

Fla., Vineland—AIRPORT—City, airport grading. **$67,050.** CAA will help finance.

Fla., Walker Springs (Mail Waciasa)—AIRPORT—City, airport grading. **$89,800.** CAA will help finance.

Fla., Wauchula—AIRPORT—City, airport grading. **$159,250.** CAA will help finance.

Fla., Weirsdale—AIRPORT—City, airport grading. **$67,050.** CAA will help finance.

Fla., West Palm Beach—AIRPORT—Palm Beach Co., airport grading. **$99,300.** CAA will help finance.

Fla., Wewahitchka—AIRPORT—City, airport grading. **$156,350.** CAA will help finance.

Fla., Wimauma—AIRPORT—City, airport grading. **$91,050.** CAA will help finance.

Fla., Winter Garden — AIRPORT — City, airport grading. **$156,350.** CAA will help finance.

Fla., Yeehaw (Mail Fort Drum)—AIRPORT—City, airport grading. **$73,300.** CAA will help finance.

Ga., Abbeville—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Albany—AIRPORT—City, airport grading, paving, **$60,000.** CAA will help finance.

Ga., Alma—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Ashburn—AIRPORT—City, airport grading, **$100,000.** CAA will help finance.

Ga., Athens—AIRPORT—City, airport grading, paving, lighting, etc. **$275,000.** CAA will help finance.

Ga., Augusta—AIRPORT—City, airport grading, paving, lighting, etc. **$260,000.** CAA will help finance.

Ga., Baxley—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Blakely—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Blue Ridge—AIRPORT—City, airport grading, etc. **$160,000.** CAA will help finance.

Ga., Buena Vista—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Cairo—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Calhoun—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Camilla — AIRPORT — City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Carrollton—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Cartersville—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Cedartown—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Claxton—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Columbus—AIRPORT—City, airport grading, paving, lighting, etc. **$335,000.** CAA will help finance.

Ga., Covington—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Cuthbert—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Dalton—AIRPORT—City, airport grading, paving, lighting, etc. **$325,000.** CAA will help finance.

Ga., Dawson—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Eastman—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Eatonton—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Elberton—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Fitzgerald—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Folkston—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Fort Valley—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Glennville—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Griffin—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

POSTWAR PROJECTS (Cont'd.)

Ga., Hawkinsville—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Hazelhurst—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Jackson — AIRPORT — City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Jesup — AIRPORT — City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., La Fayette—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Louisville — AIRPORT — City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Macon — AIRPORT — City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Macon — AIRPORT — City, airport grading, pacing, etc. **$150,000.** CAA will help finance.

Ga., Madison — AIRPORT — City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Milledgeville—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Millen — AIRPORT — City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Montezuma—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Moultrie — AIRPORT — City, airport grading, etc. **$135,000.** CAA will help finance.

Ga., Newman — AIRPORT — City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Quitman — AIRPORT — City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Richland-Lumpkin — AIRPORT — Cities, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Royston-Hartwell—AIRPORT—Cities, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Sandersville — AIRPORT — City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Soperton—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Sparta — AIRPORT — City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Springfield—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Swainsboro—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Sylvester—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Talbottom—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Tate—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Thomaston—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Thomson—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Toccoa—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Ga., Warm Springs—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ga., Washington—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., Waynesboro—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

Ga., West Point—AIRPORT—City, airport grading, etc. **$110,000.** CAA will help finance.

★ **Ga., Winder**—AIRPORT—City, airport grading, paving, lighting, etc. **$565,000.** CAA will help finance.

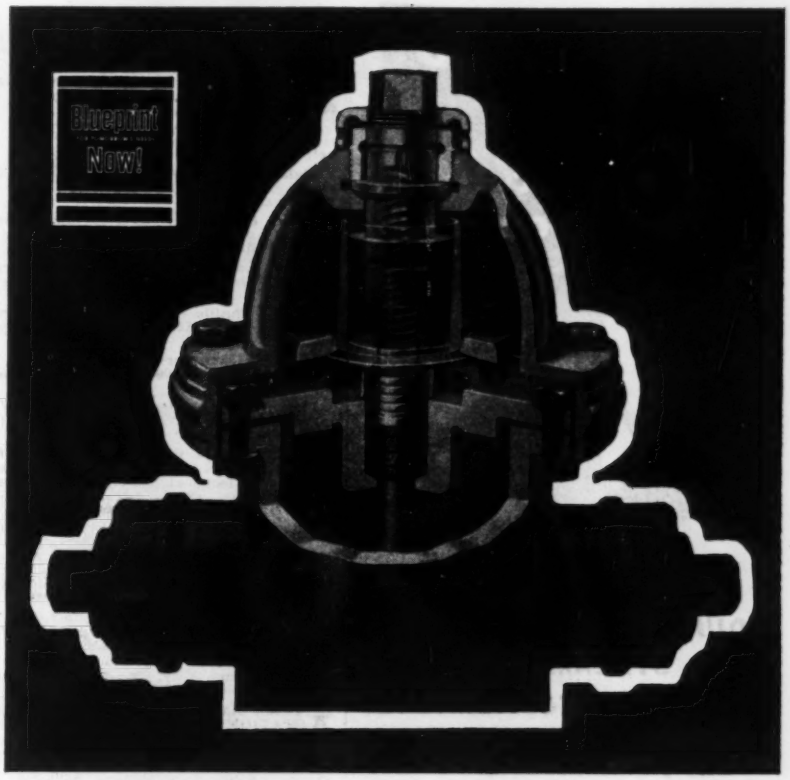
Ga., Wrightsville—AIRPORT—City, airport grading, etc. **$55,000.** CAA will help finance.

Idaho, American Falls—AIRPORT—City, airport grading, etc. **$124,000.** CAA will help finance.

★ **Idaho, Arco**—AIRPORT—City, airport grading, paving, lighting. **$559,000.** CAA will help finance.

Idaho, Ashton—AIRPORT—City, airport grading, etc. **$84,000.** CAA will help finance.

Idaho, Blackfoot—AIRPORT—City, airport grading. **$52,000.** CAA will help finance.



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Johnson Clamshell Bucket showing manganese steel teeth designed for smooth speedy digging.

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Champaign, Illinois

POSTWAR PROJECTS (Cont'd.)

Idaho, Boise — AIRPORT — City, airport grading, etc. **$100,000.** CAA will help finance.

★ **Idaho, Bonners Ferry**—AIRPORT—City airport grading, paving, lighting, etc. **$338,000.** CAA will help finance.

Idaho, Bruce Meadows—AIRPORT—City, airport grading, etc. **$117,000.** CAA will help finance.

Idaho, Burley—AIRPORT—City, airport grading, paving, etc. **$110,000.** CAA will help finance.

Idaho, Caldwell—AIRPORT—City, airport grading, paving, lighting. **$190,000.** CAA will help finance.

Idaho, Cascade—AIRPORT—City, airport grading, etc. **$88,000.** CAA will help finance.

Idaho, Challis—AIRPORT—City, airport grading, etc. **$112,500.** CAA will help finance.

Idaho, Clearwater—AIRPORT—City, airport grading. **$50,000.** CAA will help finance.

Idaho, Coeur d'Alene — AIRPORT — City, airport grading, paving, etc. **$138,000.** CAA will help finance.

★ **Minnesota** — RURAL ELECTRIC DISTRIBUTION LINES—Itasca-Mantrap Cooperative Electrical Assn., A. Felt, supt., Park Rapids, exten. rural electric distr. lines, Hubbard Co., **$1,000,000.**

Mo., St. Louis—COURT OF HONOR—City, M. M. Kinsey, pres. Bd. P. Serv., 304 City Hall, Zone 2, court of honor, on Memorial Plaza and incl. sunken court with sculptured stone shaft on block bounded by 13, 14, Market and Chestnut Sts. **$45,000.**

N. C., Halifax—AIRPORT, etc.—Halifax Co., Halifax, airport and hangars. **$150,000.** Land rights not cleared and financing not provided.

Ore., Eugene—City, City Hall, voted bonds swimming pool. **$40,000.**

★ **Tenn., Nashville**—DISTRIBUTION SUBSTATIONS, etc.—Nashville Electric Service, 605 Church St., rebuild, increase capacity distr. substations in urban areas, install feeder voltage regulator, complete changeovers to 4 kv. distr. voltage, **$195,000**; construct addnl. 13,200 volt lines so as to provide duplicate feed to urban distr. substations and install automatic changeover oil circuit breakers, **$285,000**; complete program for changing old uptown underground sys. to network sys., **$110,000**; rebuild old Broad St. underground sys. and make imprvs. at Central substation, **$165,000**; rebuild, increase capacity of suburban distr. substations and 13,200 volt feeder lines, **$80,000**; extend rural electrification in Davidson Co., **$300,000**; construct distr. substation on border of southwestern section of city (Hillsboro-Belmont) or construct special heavy feeder lines into area and install large voltage regulators, **$145,000**; 13,200 volt loop line along or adjacent to Old Hickory Blvd., **$110,000**; expand, enlarge present area fed by underground sys., and convert direct current sys. to alternating current sys., **$200,000.**

Tex., McAllen—RADIO STATION—Howard W. Davis, National Bank Comn. Bldg., San Antonio, radio station. **$25,000** or more.

★ **Newfoundland, St. John's** — WATER POWER DEVELOPMENT — Labrador Mining & Exploration Co., Ltd., 360 St. James St., Montreal, Que., water power development at Grand Falls on Hamilton River. **$500,000.**

N. S., Antigonish—STREET LIGHTING SYSTEM—Municipality, H. R. Chisholm, clk., street lighting sys. imprvs., throughout town. **$40,000.**

★ **Ont., Fort Hope** — HYDRO-ELECTRIC DEVELOPMENT—Hydro-Electric Power Com. of Ontario, University Ave., Toronto, survey completed hydro-electric development on Jackfish River, 100,000 hp. **$750,000.**

Ont., Galt — SWIMMING POOL — City, swimming pool. **$40,000.** Funds available.

PLANS UNDER WAY

Ala., Anniston—FIRE ALARM SYSTEM—City, City Hall, fire alarm sys. **$50,000.** Financing not provided. Ladd Eng. Co., 209 Park Bldg., Mobile, consult. engr.

★ **Calif., Glendale** — UNDERGROUND ELECTRICAL DISTRIBUTION, etc. — City, P. Diederich, supt. Pub. Serv., 119 North Glendale Ave., preliminary plans underground electrical distr., **$696,600**; electrical distr. pole line replacement, **$662,000**; tropico electrical substation, **$75,000.** J. C. Albers, City Hall, city engr. CD 11/22—ENR 12/14.

★ **Calif., Long Beach**—DOCKS, etc.—City, City Hall, preliminary studies completing Alamitos Bay Marina, incl. docks, slips, wharves, rock jetties, railroad roadbeds, dredging, removing highway bridges, constructing new bridges, paving access, installing water, gas, light and sewer mains, protective jetties, moles, clubhouse and locker bldgs. **$6,200,000.** Financing not provided. G. E. Baker, City Hall, city engr.

Calif., Long Beach—FIRE ALARM SYSTEM—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans 10% completed fire alarm sys. **$29,000.** Funds available. R. R. Shoemaker, ch. harbor engr. G. H. Baker, city engr.

★ **Calif., Long Beach**—GAS STORAGE TANKS, etc.—Gas Dpt., W. H. Partridge, supt. Municipal Utilities Bldg., Zone 2, plans 30% completed 4 high pressure gas storage tanks, Spring St., east of Junipero Ave., **$440,000**; 5,000,000 cu. ft. telescopic type gas storage holders in steel tanks, **$714,000**; preliminary plans, 28,200 ft. 12 in. feeder main in Ocean Ave., $171,200; 15,000 ft., 8 and 10 in. feeder mains in Santa Fe Ave., **$54,200**; plans gas compressor plant, Cherry Ave. near 70th St., **$142,000.** Funds available. G. H. Baker, City Hall, city engr.

★ **Calif., Long Beach**—GRANDSTAND, etc.—City Recreation Comn., W. L. Scott, dir., Municipal Auditorium, recreation park grandstand, **$85,000**; Marine Stadium, **$250,000**; Atlantic Ave. Park, **$175,000**; improvement park, Atlantic Ave., **$175,000**; West side community project, **$175,000**; imprv. Pine Beach Park, **$50,000**; ball field and grandstand, Houston Park, **$85,000.** Financing not provided.

★ **Calif., Long Beach**—PIERS, etc.—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans 5% completed imprv. Pier B, **$3,700,000**; plans 10% completed wharves and fill at Pier C, **$3,200,000**; exten. Pier B, **$1,900,000**; plans 25% completed Transit Shed Pier A, Berths 4 and 7, **$1,034,800**; land development at Pier A and E, Outer Harbor, **$793,000**; completing Pier D, **$970,000**; plans 75% completed transit sheds Pier D, **$80,000**; transit shed, Pier 2, Berths 52, 53 and 54, **$562,000**; plans 50% completed transit sheds Pier A, Berths 3 and 4, **$450,000**, Berth 5, **$330,000**; developing Victory Piers, incl. asphaltic concrete paving, railroad ties, rein.-con. piles, etc., **$267,400.** Funds available. R. R. Shoemaker, city harbor engr. G. B. Baker, city engr.

★ **Calif., Long Beach**—STREET LIGHTING SYSTEMS—City, City Hall, installing new street lighting sys.; altering 29.52 mi. street lighting sys., **$840,250.** Financing not provided. G. E. Baker, City Hall, city engr.

★ **Calif., Long Beach**—SWIMMING POOL, etc.—City Recreation Comn., W. L. Scott, dir., Municipal Auditorium, plans 90% completed swimming pool in Houghton Park, **$110,000**; plans 25% completed imprv. Mac Arthur Park, **$200,000**; plans 10% completed Veterans Memorial Park, **$175,000**; plans 15% completed imprv. Admiral Kidd Park, **$150,000**; plans 10% completed constructing 4 beach bath houses, **$160,000.** Financing not provided.

Calif., Redwood City—PARKS, etc.—City, City Hall, plans under way imprv. park, community center, swimming pool, lake, landscaping, **$224,000.** Bonds voted. R. J. Clarke, City Hall, city engr. CD 11/16—ENR 11/30.

Calif., Redwood City—STREET LIGHTING—City, City Hall, plans under way imprv., exten. street lighting, **$35,000.** Bonds voted. R. J. Clarke, City Hall, acting city engr. CD 11/16—ENR 11/30.

★ **Calif., San Diego**—PIERS, etc.—City Civic Center, plans under way piers, yacht harbor, airport imprvs., **$4,500,000**; plans completed bulkhead, **$75,000.** Financing not provided. B. D. Phelps Harbor Dpt., asst. port dir.; Mission Bay and beach, beach acquisition and imprvs., playgrounds and sports fields, **$972,000**, land rights not cleared, legal obstacles to be overcome and financing not provided.

★ **Ia., Davenport**—AIRPORT—City, City Hall, some preliminary surveys and plans made to determine proper site, airport, **$1,000,000.** Consoer, Townsend & Associates, 211 W. Wacker Dr., Chicago, Ill., consult. engrs. F. I. Martens, chn., Airport Com., City Hall. E. D. Stapp, City Hall, city engr.

Ia., Keokuk—SWIMMING POOL, etc.—City, City Hall, plans completed swimming pool, fountain in park, **$110,000.** Financing not provided. H. A. Brown, Ottumwa, consult. engrs. C. J. Nelson, City Hall, city engr.

Kan., Atchison — PARK SHELTER HOUSE, etc. — City, City Hall, park shelter house, swimming pool alterations, etc. **$50,000.** E. Hellener, City Hall, city engr.

Kan., Hutchinson — AIRPORT BLDG.—City, City Hall, plans completed concrete administration bldg. at airport. **$150,000.** Financing not provided. McCracken & Heitt, 308 W. 20 St., archts. A. R. Campbell, City Hall, city engr.

Ky., Owensboro—SWIMMING POOL—City, City Hall, swimming pool. **$60,000.** Financing not provided. G. A. Lovern, comr. Pub. Property. J. C. Kealey, City Hall, city engr.

Mass., Brimfield—PARK, etc.—Commonwealth of Massachusetts, Dpt. Conservation, 15 Ashburton Pl., Boston, plans 90% completed general imprvs., several new bldgs. Robinson and Skinner Parks. **$75,000.** Financing not provided. R. M. Sizer, 15 Elm St., Westfield, archt. CD 10/25—ENR 11/2.

OSTWAR PROJECTS (Cont'd.)

Mass., Norwood and Canton—AIRPORT—W. Wiggins Airways, Inc., Norwood, preliminary sketches by H. J. Korslund, 153 Chastan St., Norwood, airport exten. Over $50,000. Financing not provided.

Mich., Detroit — POWER LINE — Public Lighting Comn., 174 E. Atwater St., plans 75% completed Bluehill Service and Loop Tie down Philip to Connor Ave., to future Whittier lighting station, 24 kv. power line, $200,000. G. R. Thompson, City Hall, city engr.

O., Lorain—COAL LOADING DOCK—Baltimore & Ohio R. R. System, A. C. Clarke, ch. engr., Baltimore and Charles Sts., Baltimore, Md., 1,100 ft. coal slip, formed by 2 piers exten. into harbor just west of mouth of Black River, etc. $2,000,000-$3,000,000.

O., Tiffen — SWIMMING POOL — City, Municipal Bldg., plans under way municipal swimming pool. $70,000. Bond issue approved. H. G. Kuhn, Municipal Bldg., city engr.

Pa., Ardmore — MEMORIAL PARK — Comrs. Lower Merion Twp., Ardmore, Botanical Society of Lower Merion, G. Hasson, pres. Episcopal Academy, Merion, plans 35% completed by M. Stevenson, 225 S. 15 St., Phila., memorial park, incl. planting trees and shrubs, grading entire area, diversion of stream to form pond, etc. $100,000 or more.

R. I., Providence—BROADCASTING STATION—Yankee Network, Inc., Crown Hotel, plans by Harry E. Davidson & Son, 50 Beacon St., Boston, Mass., radio television broadcasting station. $200,000.

S. C., Charleston—TOWER, etc.—City, plans 5% completed by H. Tatum, 34 Broad St., World War II memorial in Hampton Park, incl. 186 ft. tower, organ chamber and exhibition space. $500,000.

Tex., Dallas—RAILWAY TRACKS—City, City Hall, railway tracks through southern part of city. $150,000. H. Bartholomew & Associates, 317 N. 11 St., St. Louis, Mo., and City Hall, Dallas, consult. engrs.

Tex., Fort Worth—STREET LIGHTING—J. H. Bothwell, city mgr., City Hall, plans 35% completed expan. street lighting, incl. reconstructing 17 circuits and light underpasses, bridge and new residential areas, $120,000. W. O. Jones, City Hall, dir. P. Wks.

Tex., McAllen—RADIO STATION—Valley Broadcasting Assn., Inc., c/o L. M. Bentsen, Mission, plans 10% completed radio station. Over $25,000.

Man., Winnipeg — POWER DEVELOPMENT—Province of Manitoba, Winnipeg, power development on The White Mud Falls on Nelroon River, 20,000 hp. $350,000. Manitoba Power Comn., Winnipeg, engrs.

Ontario — POWER DEVELOPMENT — Hydro-Electric Power Comn. of Ontario, University Ave., Toronto, survey work completed power development on Aquasabon River, Lake Superior region, 200,000 hp. $1,000,000.

Ont., Guelph — SWIMMING POOL — City, H. J. B. Leadlay, clk., swimming pool. $70,000. Funds available. H. S. Nicklin, c/o owner, engr.

Ont., Hamilton—PARKS—City, City Hall, parks program at various locations, incl. band shells, swimming pools, tennis courts, club houses, fences, grand stands, etc. $500,000. E. H. Darling, owner, engr.

Saskatchewan—HYDRO PROJECT—Provincial Govt., Regina, constructing Fort la Corne hydro project on Saskatchewan River, serving Prince Albert, Saskatoon, Regina and Moose Jaw. $20,000,000. H. G. Acres, c/o owner, engr.

READY FOR BIDS

Calif., Long Beach—TERMINAL AND WHARF, etc.—City Harbor Dpt., 1333 W. El Embarcadero, Zone 2, plans completed terminal and wharf imprvs., $1,750,000; railroad trackage, yards and main line, $500,000. Funds available. R. R. Shoemaker, ch. harbor engr. G. H. Baker, City Hall, city engr.

Ia., Oelwein — SWIMMING POOL — City, City Hall, plans completed swimming pool. $36,000. E. E. Schenk, 214 Waterloo Bldg., Waterloo, consult. engr. and archt. K. L. Kraft, Oelwein, engr. CD 4/12—ENR 4/20.

Mich., Detroit—PARK IMPROVEMENTS—Dpt. Parks & Recreation, 735 Randolph St., plans completed park development at Asbury Park, grading, finishing, draining, etc., 2,500 ft. sewers, 5,000 ft. watermains, sidewalks, tennis courts, shuffle board courts, drinking fountains, 40x100 ft. wading pool. $157,500. G. R. Thompson, City Hall, city engr.

Wis., Janesville — BATHHOUSE — City, City Hall, plans completed 1 story, 44x72 ft., two 40x50 ft. wings, stone on lightweight block, steel trusses, concrete fdn. $50,000. J. Lustig, City Hall, engr.

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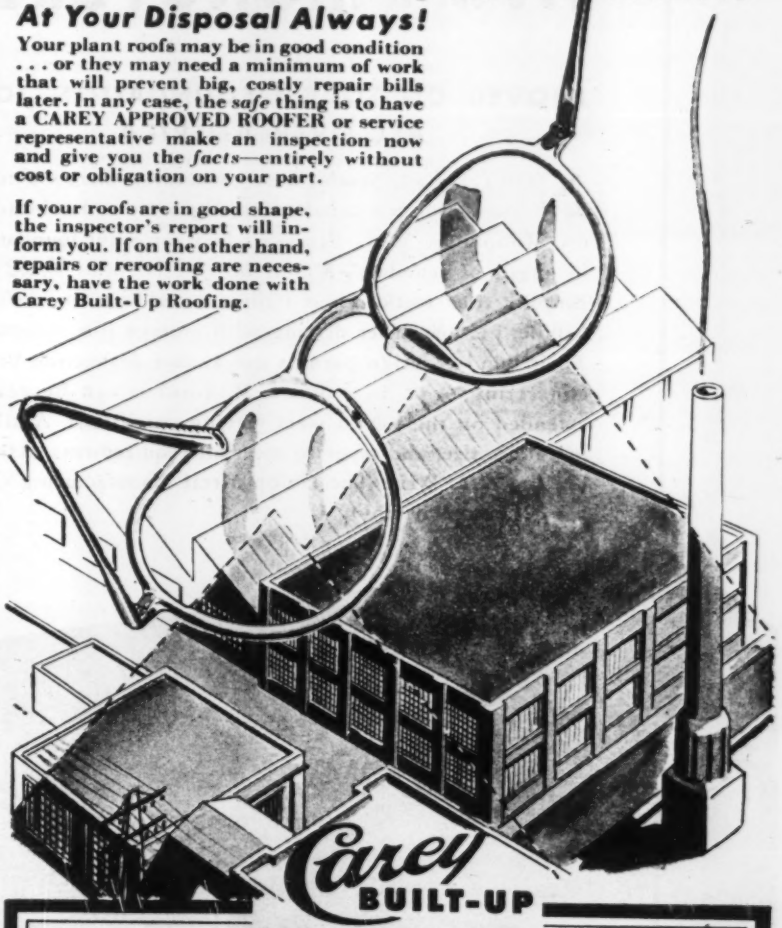

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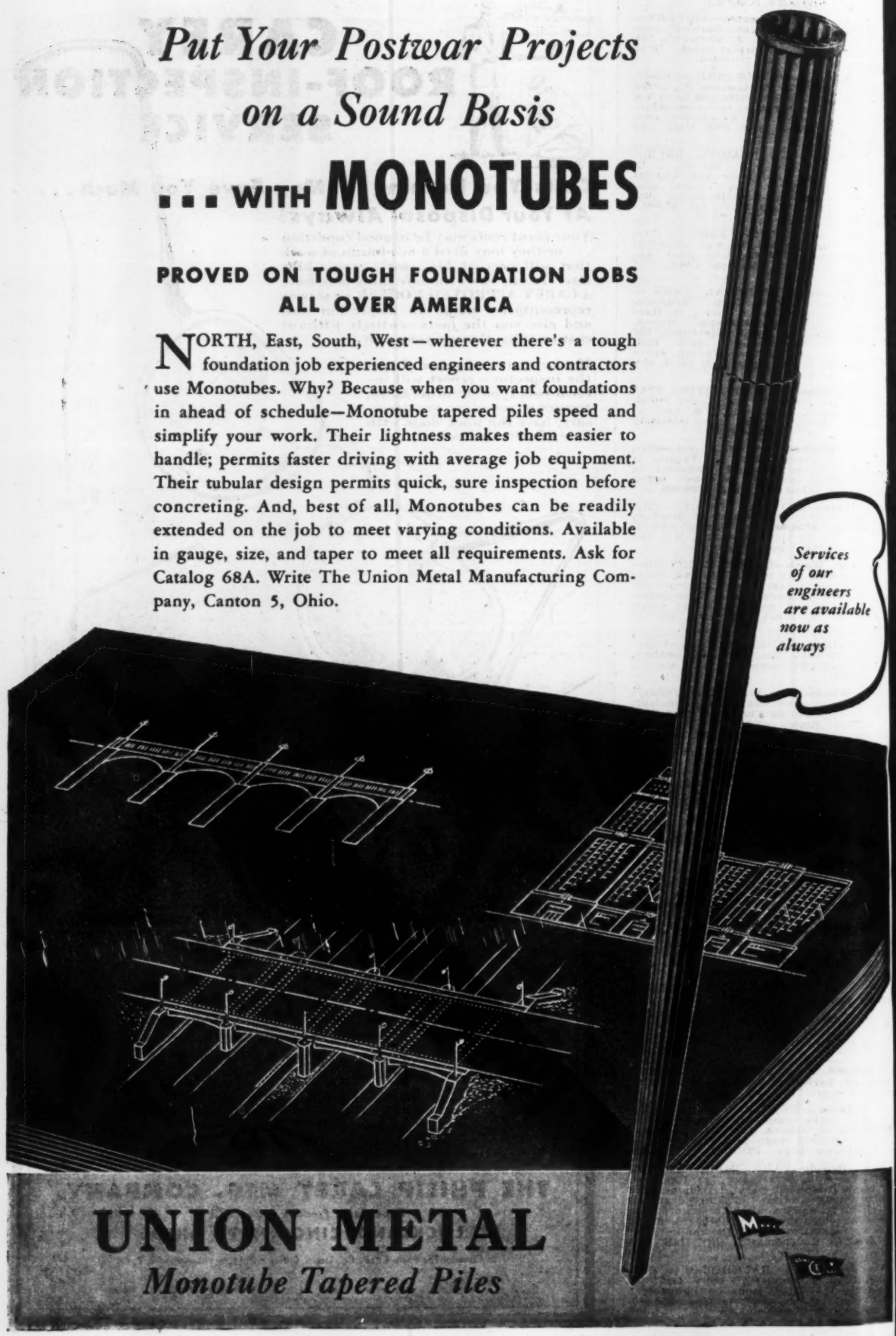

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WATER SUPPLY

PROPOSED WORK

Calif., Fallbrook—Fallbrook Public Utility Dist., Fallbrook, voted bonds, reservoir, pumps, sand traps and pipeline addns. water sys. $135,000. Kistner, Curtis & Wright, 318 Spreckles Bldg., San Diego, engrs. CD 3/29—ENR 4/6.

Calif., San Diego—City, 3,460 ft. 24 in. steel cylinder rein.-con. feeder pipeline to maintain pressure at Consolidated-Vultee and 11th Naval Dist. headquarters. Over $15,000. J. W. Williams, Civic Center Bldg., city administrative engr.

La., Luling—City, water supply sys., purification plant. Over $25,000. Shourds, Mogabgab & Bean, Audubon Bldg., New Orleans, engrs.

†**Neb., Crawford**—City, revising plans watermains, reservoir, Neb. 25-156. $123,000, FWA. R. Fulton, 2327 S. 19 St., Lincoln, engr. CD 10/3—ENR 10/5.

★ **Va., Charlottesville**—City, dam on Moorman's River creating 500 m.g. reservoir. $500,000.

N. S., Dartmouth—Municipality, water tower to raise and increase water pressure. $40,000.

Ont., Merrickville—Municipality, J. Jakes, reeve, Merrickville, deep well water supply sys. $25,000.

Que., Hull—Municipality, filtration plant. $150,000.

Que., Chandler—Municipality, W. Lucas, sec., dam for water storage on River Valpy. $30,000. Dpt. P. Wks., Quebec City, engr.

BIDS ASKED

Bids Asked January 2

Miss., Luverne—Village, E. Thron, supt. utilities, installing elevated steel water tower and 200,000 gal. tank. $15,000. R. D. Thomas & Associates, 1200 2 Ave. S., Minneapolis, engrs. CD 6/22—ENR 6/29.

Bids Asked January 4

†**Tex., Bay City**—City Secretary, Contr. 4 water wells, Tex. 41-702-N, for City, S. E. Houghtis, mayor. $15,000. Plans deposit $10. A. Russell, Bay City, engr. CD 11/15—ENR 11/23.

Bids Asked January 9

La., Shreveport—Office of Secretary-Treasurer, City Hall Bldg., addns. to enlarge present chemical storage space of water and sewerage department. J. C. Peyton, 416 City Bank Bldg., archt.

LOW BIDDERS

Ill., Chicago—City, O. E. Hewitt, comr. ★ P. Wks., City Hall, Dec. 18, filter equipment, South District Filtration Plant, Lake Front east of South Shore Dr. and north of 79 St., from Pitt Construction Co., Inc., 225 Washington Blvd., Pittsburgh, Pa., $942,738. CD 11/15—ENR 11/23.

CONTRACTS AWARDED

†**Calif., Stockton**—U. S. Eng., 1209 8 St., Sacramento, Zone 8, addnl. water supply facilities at Ordnance Depot, Spec. 1014, to Markwart Co., P. O. Box 2104, Sacramento, $44,397.

Tex., San Antonio—City, G. B. Mauermann, mayor, 3 mi. 6- to 8-in. c.i. mains to municipal airport and addnl. water distr. lines, Edgewood Addn., force account. $39,500. CD 11/24—ENR 11/30.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Miss., Osseo—Village, G. M. Heesen, clk., City Hall, voted $75,000 bonds, sanitary sewerage sys., sewage disposal plant. $75,000. CD 12/5—ENR 12/7.

†**Tex., Harlingen**—City, sewage plant imprvs., expansion. $30,000. FWA. A. Tatum, 107 S. 1 St., engr. CD 10/24—ENR 10/26.

★ **Va., Norfolk**—Hampton Roads Sanitation Comn., Flatiron Bldg., Norfolk, plans completed, bids soon sewage treatment plants at Little Boat Harbor, Newport News; Army Base, 39 St., Norfolk, Berkeley Sect., Norfolk, Pennens Point, Portsmouth, incl. pump. stations, water and trunk sewers, outfall sewers, etc. $8,000,000. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., and Adams Bldg., Norfolk, Va., engrs.

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering New-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads); BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

BIDS ASKED

Bids Asked December 28

Kan., Abilene—At office M. E. Caulkins, city clk., sanitary outfall sewer incl. 5,400 lin. ft. c.i. pipelines, 73 lin. ft. 10 in. flexjoin c.i. pipeline, 504 lin. ft. 10 in. c.i. pipeline, concrete pump sta. with 2 pumps and controls, etc. CD 11/22—ENR 11/30.

LOW BIDDERS

Ill., Chicago—J. M. Whalen, chn. Com. of Finance, 910 S. Michigan Ave., Dec. 14, Contr. 44-29-SW-M, furnishing, installing piping, auxiliary equip., Southwest Sewage Treatment Works, for Sanitary Dist. of Chicago, 910 S. Michigan Ave., from James H. McCauley & Sons, 5620 W. 65 St., $76,390. Received no bids Dec. 14, reconditioning sewage screens at Calumet Sewage Pump. Sta., Contr. 44-42(CLP-M). CD 12/8.

Tex., Grand Prairie—City, G. H. Turner, mayor, City Hall, Dec. 16, storm sewers, from P. C. Sorenson Co., 613 Southland Life Bldg., Dallas, $30,079. CD 12/5—ENR 12/7.

CONTRACTS AWARDED

Calif., Burbank—City, City Hall, sanitary sewer in Screenland Dr. and Clark Ave., force account. Bids 12/5, rejected. CD 12/14—ENR 12/21, under LB.

†**Mo., Affton** (St. Louis 23, P. O.)—Affton Sanitary Sewer Dist., C. Kuna, secy., 9209 Niles Ave., Affton, St. Louis 23, approx. 5,000 ft. 8 and 10 in. sanitary sewers, etc., Mo. 23-284, to Thos. J. Sheehan Co., 2233 Olive St., St. Louis, Zone 3, $27,381. FWA. Bids 11/20. CD 11/13—ENR 9/28.

Ont., Islington—Etobicoke Twp., Islington, storm sewers within Islington Storm Sewer area, to Scott-Jackson Const. Co., Ltd., Evans Ave., New Toronto, $25,000. F. McArthur, Twp. Hall, Islington, engr. CD 3/30—ENR 4/6.

BRIDGES

LOW BIDDERS

Calif., Los Angeles—Bd. P. Wks., City Hall, Dec. 13, 3 timber bridges over Los Angeles River at Corbin Ave., Yanowen St. and Canoga Ave., from C. Bongiovanni, 2561 Canyon Dr., $59,999. Est. over $25,000.

STREETS AND ROADS

BIDS ASKED

Bids Asked January 5

Alabama—State Hy. Dpt., G. R. Swift, hy. dir., Montgomery, grading, draining, concrete paving, removing structures 10.501 mi. Tuscaloosa-Bucksville Rd., SN-FAP-298-A (1); 10.592 mi. same road, SN-FAP-298-B (1); 1.752 mi. same road, SN-FAP-95-C (2), 185-C (2) and SN-FAGH-185 C (3); constructing bridges 0.064 mi. same road, FAP, SN-FAGH-185 C(3) and SN-FAP-185 C(2); bridges on 0.062 mi. same road, FAP. Nos. SN-FAP-298 A(1) and 298-B(1), all foregoing in Tuscaloosa Co. Plans deposit $10 each.

Ia., Allison—Bd. Supervs. Butler Co., Allison, quarrying, crushing, stockpiling 16,000 cu. yd. Class A stone, incl. 200 cu. yd. stripping at various county-owned quarries. Oper $25,000. J. L. Stober, Allison, co. engr.

LOW BIDDERS

★ **Indiana**—State Hy. Comn., S. C. Hadden, chn., Indianapolis, Dec. 19, imprv. 3.87 mi. Clark Co., from Mid-American Engr. Corp., Skokie, Ill., $111,155, est. $127,851; 20.2 mi. Dekalb Co., from John Dehner, Inc., 1206 Clark St., Fort Wayne, $246,746, est. $301,770***7.85 mi. Rd. 9, Huntington Co., from Hipskind Drainage Co., 1725 Winter St., Fort Wayne, $106,951, est. $123,382*** 4.5 mi. Lake Co., from S. G. Hayes & Son Co., 600 S. Michigan Ave., Chicago, Ill., $111,332, est. $146,891***9.04 mi. La Porte Co., from Rock Road Constr. Co., 612 Jefferson St., Frankfort, $125,188, est. $125,188***6.84 mi. Martin Co., and 10.23 mi. Orange and Martin Counties, from Indiana Asphalt Paving Co., 2810 Columbia Ave., Indianapolis, $97,005 and $257,919 respectively, est. $121,185 and $308,975 respectively*** 19.56 mi. Noble Co., from Bontrager Constr. Co., 618 W. Indiana St., Elkhart, $237,723, est. $289,090***19.26 mi. Parke Co., from Reith-Riley Constr. Co., W. Madison St., Goshen, $185,938, est. $203,487***14.9 mi. Madison and Delaware Counties, from W. L. Magaw, Hawkins Rd., Richmond, $347,521, est. $390,930***9.45 mi. Jackson Co. and 25.52 mi. Morgan, Johnson and Marion Counties, from W. D. Vogel, 3760 E. St. Clair St., Indianapolis, $99,984 and $236,134 respectively, est. $110,708 and $236,890 respectively***14.2 mi. Tippecanoe and Clinton Counties, from Lantry & Teegarden, Box 422, Columbus, $170,776, est. $209,433. CD 12/5—ENR 12/7.

†**Ore., Ily**—Pub. Rds. Admin., New P. O. Bldg., Portland, surfacing 20 mi. South Kanott timber access road, from R. A. Heintz, 8101 N.E. Union Ave., Portland, $44,810.

CONTRACTS AWARDED

Georgia—State Hy. Dpt., Atlanta, imprv. 2.246 mi. Jenkins Co., to Scott Constr. Co., Thomasville, $462,807; 0.549 mi. Emanuel and Burke Counties, to H. G. Smith, Fitzgerald, $289,807. Bids 12/15. CD 11/28—ENR 11/30.

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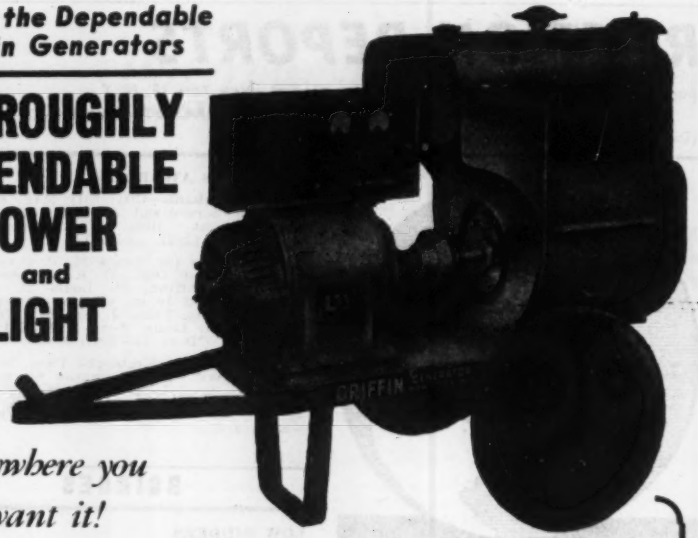

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EARTHWORK, WATERWAYS

PROPOSED WORK

★**Calif., Ventura**—Ventura Co., Court House, flood prevention imprvs., and imprv. water supply. Over $500,000. D. R. Warren Co., 500 S. Figueroa St., Los Angeles, engr.

Tex., Austin—Lower Colorado River Auth., c/o M. Starcke, American Statesman Bldg., Austin, and Marshall Ford, imprv. Colorado River Dam and hydro-electric plant, Marshall Ford, 30 mi. west of here. $156,000.

Puerto Rico, San Juan—Insular Emergency Council, San Juan, plans public beach at seashore between present Army and Navy Beaches, covering 700 ft. sandy surf and extending 450 ft. out into water, incl. heavy stone block breakwater, etc., under sponsorship War Emergency Program. $75,000.

BIDS ASKED

Bids Asked January 4

†**Arkansas**—U. S. Eng., P. O. Box 60, Vicksburg, Miss., constructing approx. 75,000 cu. yd. (net) earthwork on east bank of Red River, Item R-415.5-L, Station 0/00 to 40/21, Solic. No. 22-052-45-61. Lafayette Co.

Bids Asked January 16

†**Nev., Boulder City**—Bureau Reclamation, Dpt. Interior, W. R. Young, acting ch. engr., Boulder City preparation of concrete aggregates, involving 10,000 cu. yd. excav., stripping deposit, preparing and stock-piling 33,000 tons sand, 28,000 tons 3/16- to 3/4-in. and 25,000 tons 3/4 to 1½-in coarse aggregate, Boulder Canyon Project, Arizona-California-Nevada, near here, Spec. 1787-D.

CONTRACTS AWARDED

Conn., Branford—State, Office of the Comptroller, State Capitol, Hartford, dredging Sybil Creek, reinforcing bridge, to DeFonce Constr. Co., 110 Colonial Ave., Bridgeport, **$17,000.**

†**Fla., Jacksonville**—U. S. Eng., 575 Riverside Ave., Zone 2, dredging approx. 150,000 cu. yd. material from channel near Municipal Docks to provide 32 ft. channel, 400 ft. wide, by own forces. **$75,000.**

Ont., Walpole Island (Wallaceburg)—Dpt. P. Wks., Ottawa, Ont., shore protection work to R. A. Bell, 7 St. Andrews Gardens, Toronto, **$51,805.** CD 10/9—ENR 10/12.

LATIN AMERICA

Colombia, Bogota — Sindicato de Inversiones, S. A., c/o Socony-Vacuum Oil Co., Inc., Bogota, plans laying new crude oil pipeline carrier in vicinity of Monteria, near here. $250,000.

Mexico, Mexico City—Cia. Wyeth-Stille (Lic. Agustin Rodgriguez, Jr., rept., Gante 11-407, Mexico, D. F., plans penicillin factory. $150,000.

Mexico, Parras—Municipal Govt., Palacio Municipal, Parras, plans secondary and polytechnical educational center, accomodating 2,000. $450,000.

Peru, Chimbote—Corporation Peruana del Santa, Lima, plans steel plant. $200,000.

Peru, Huallanca—Corporation Peruana del Santa, Lima, plans further development of power on Santa River, developing anthracite coal reserves in Santa Valley on 5½ mi. diversion tunnel, electrification of 86 mi. railroad from Chumbote to Huallanca. $30,000,000.

Peru, Mollendo—Southern Railways of Peru, Lima, plans railroad to connect town directly with Matarani. $300,000.

Venezuela, Caracas — Creole Petroleum Corp., c/o Standard Oil Co. of New Jersey, Caracas, takes bids about January 1, constructing 40,000 bbl. daily capacity refinery plant. $5,000,000.

PUBLIC BUILDINGS

PROPOSED WORK

†**Calif., Richmond**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, 75 family trailer housing. Calif. 4973.

†**Calif., San Francisco-San Pablo Bay**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 75 unit family, stop-gap housing. Calif. 4973.

†**Calif., Stockton**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 25 unit family stop-gap housing. Calif. 4969.

Conn., Windsor—Town, Bd. Selectmen, Town Hall, plans by E. T. Duncan, 12 Harvey Rd., tile, stone mixing plant for black top highway bldg., incl. shop, garage and offices, Stimson Property. $40,000.

Minn., Mankato—State, c/o State Teachers College Bd., State Office Bldg., St. Paul, men's dormitory. $250,000.

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†**Nev., Mt. Hope**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 10 unit family stop gap housing, Nev. 26175.

†**N. Y., Syracuse**—Pub. Housing Auth., NHA, 270 Bway., New York, Zone 7, 45 unit single person stop-gap housing, N. Y. 30179.

†**N. Y., Greenhaven**—U. S. Eng., 120 Wall St., New York, Zone 5, indefinitely postponed bids to have been opened Dec. 19, recreation bldg. CD 11/22—ENR 11/30.

★†**N. D., Fargo**—Veterans Admin., Vermont Ave. between H and I Sts, N.W., Wash. 25, D. C., bids soon, veterans hospital addn. $1,650,000. CD 2/16—ENR 2/24.

Pa., Drexel Hill—Delaware County Hospital, Drexel Hill, preliminary plans by Zantzinger & Borie, 1531 Locust St., Phila., hospital addn. $150,000-$250,000.

†**R. I., Newport**—Newport Hospital, H. J. Dunham, supt., Friendship St., plans completed by E. H. Wigham, 315 S. 15 St., Phila., Pa., hospital addn. $85,000. **FWA.**

Tex., Brownsville—City, 2 story, brick, rein.-con. express storage bldg. $40,000.

★†**Va., Martinsville**—Martinsville General Hospital, Inc., Peoples Bank Bldg., hospital and nurses' home, Va. 44-370, to Harry B. Graham Co., P. O. Box 630, Charlottesville. $524,623. **FWA.** Bids 12/7. CD 12/12—ENR 12/14, under LB.

†**Wyo., Crooks Gap**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle 1, Wash., 9 unit family stop-gap housing, Wyo. 48104.

Alta., Bitumount—Province of Alberta, Edmonton, pilot plant to ascertain economic feasibility of separating oil products from oil sands deposits along Athabaska River. $250,000. Dpt. P. Wks., Edmonton, engr.

Alta., Calgary—Dominion Govt., c/o Ministry of Veteran Affairs, Ottawa, Ont., plans by Dpt. P. Wks., Ottawa, Ont., 200 bed health and occupational centre for ex-servicemen. $200,000.

Man., Winnipeg—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., plans by Dpt. P. Wks., Ottawa, Ont., 200 bed health and occupational centre for Dominion convalescent ex-servicemen. $200,000. CD 8/14.

Puerto Rico, San Juan—Insular Emergency Council, approved construction 4 warehouses, oil storage shed, 2 office bldgs., and gas station, at Las Monjas, for War Emergency Program. $175,000.

N. S., Wolfville—Municipality, town hall. $150,000.

N. S., Halifax—Municipality, remodeling main bldg. at City Field for purpose providing suitable quarters for Utility Commission and Works Dpt. $150,000. R. M. McKinnon, City Hall, comr. Works and engr.

Ont., Brockville—General Hospital Bd., c/o W. Osmond, secy., plans by H. P. Smith, 11 Court House Ave., hospital wing. $250,000. CD 1/20.

Ont., Eastview (Postal Dist. Ottawa)—Province of Ontario, c/o Ministry of Educ., Queen's Park, Toronto, high school. $150,000.

Ont., Leaside (Postal Dist. Toronto)—Municipality, plans by Adamson & Morgan, 3 St. Thomas St., Toronto, memorial centre. CD 12/6—ENR 12/14.

Ont., London—Bd. Educ., plans by L. E. Carrothers, Bd. of Education Offices, London, school, Chelsea Green area. $150,000.

Ont., Sarnia—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, housing on 70 acre site. $150,000.

Ont., Windsor—Essex Co., Windsor, Home for Aged. $150,000.

Que., Buckingham—School Trustees, R. MacCallum, secy., Buckingham, plans by Luke & Little, 1410 Guy St., Montreal, 2 story, bsmt., 66x132 ft., brick faced, rein.-con. school. $150,000.

Que., Hull—Municipality, hospital for contagious diseases, $200,000; home for aged folk, $150,000.

Que., Sennevville—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., plans by Dpt. P. Wks., Ottawa, Ont., 400 bed health and occupational centre for ex-servicemen. $350,000.

Que., Sherbrooke—School Com., Sherbrooke, plans by J. A. Poulin, 63 Prospect St., High School of Commerce. $150,000.

Que., Westmount — Westmount School Comrs., Academy Rd., high school. $300,000.

Sask., North Battleford—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., dwellings on 50 acre site. $150,000. City will provide light and water services and Dominion Govt. will build necessary streets.

BIDS ASKED

Bids Asked In January

Minn., Glen Lake—Hennepin Co. Welfare Bd. Comn. for Home School for Boys, G. Alexander, chn., 110 Court House, Minneapolis, administration bldg., altering existing bldgs. $193,000. White & MacGregor, 1108 Nicollet Ave., Minneapolis, engrs. CD 4/27—ENR 5/4, under Minneapolis.

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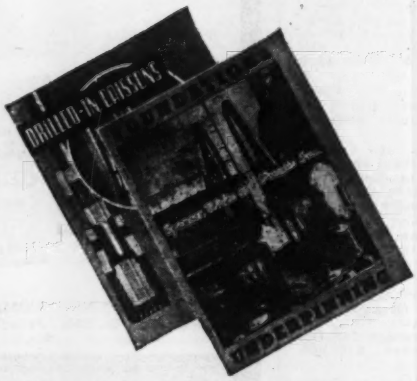

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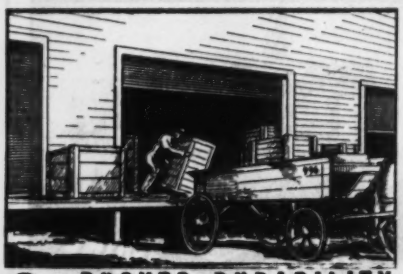

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PUBLIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked January 3

†**Ala., Tuskegee** — Tuskegee Institute, Tuskegee, nurses' home and training school, Ala. 1-293-N. $160,000. FWA. Plans deposit $25. E. C. Miller, Tuskegee, archt. CD 10/3—ENR 10/5.

Miss., Batesville — City, D. Ferguson, mayor, 1 story, 127x147 ft. glove factory, tile, stucco, concrete, steel frame, $80,000. Plans deposit $5. Miss E. L. Malvaney, Millsaps Bldg., Jackson, archt. CD 12/28—ENR 21/21, under Industrial Bldgs.

†**S. C., Charleston**—At office F. O. Bates, supt. Roper Hospital, Min Bldg., Lucas St. and Calhoun Sts., completing contract New Roper Hospital, S.C. 38-149 (NF), for Medical Society of South Carolina, Roper Hospital. FWA. Plans deposit $20. Samuel Hannaford & Sons, 1024 Dixie Terminal Bldg., Cincinnati, O., archts. CD 8/15—ENR 8/17, under LB.

Bids Asked January 5

†**Va., Dublin**—Pub. Housing Auth., NHA Georgia, Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., dismantling, moving 150 unit portable housing, Va. 44067, now located at Newport News, and re-erecting same here.

Bids Asked

†**Mass., Boston**—U. S. Eng., 31 St. James Ave., Boston (selected list bidders), brick garage, Pier 4.

Bids Asked

†**Tex., Ellington Field (br. Houston)**—U. S. Eng., Ellington Field, remodeling 36 barracks bldgs. into classrooms, etc. $150,000.

Bids Asked February 6

†**Ky., Lexington**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Laundry Bldg. 22, Continued Treatment Bldg. 27, N.P. Infirmary Bldg. 28, Acute Bldg. 29, O.T. Shops Bldg. 37, etc. $2,000,000. CD 2/16—ENR 2/24.

LOW BIDDERS

†**Calif., Bellflower**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., Dec. 18 classroom school, etc., from Roscoe & Land Constr. Co., 1125 S. Robertson Blvd., Los Angeles, **$176,142.** CD 11/27—ENR 11/30.

★†**Calif., San Francisco**—Pub. Housing Auth., NHA, 760 Market St., Dec. 12, 435 unit family dwellings, off Bayshore Hy., near Geneva Ave., Calif. 4896N, from De Luca & Son., Inc., 1745 Filbert St., **$1,079,000.** CD 12/4—ENR 11/23.

CONTRACTS AWARDED

†**Ala., Gadsden**—Holy Name of Jesus Hospital, Gadsden, nurses' home, Ala. 1-289-N, to R. P. Farnsworth & Co., P. O. Box 1511, New Orleans, La., **$182,314.** FWA. Bids 12/12. CD 11/29—ENR 12/7.

★†**Ala., Tuscaloosa**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., general contract hospital, infirmary, OT shop and garage, etc., to City Constr. Co., 914 Housatonic Ave., Bridgeport, Conn., **$759,990.** Bids 12/5. CD 12/7—ENR 12/14, under LB.

★†**Calif., Alameda**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, 340 war dwelling units for Navy personnel, Calif. 4895-N, to L. Epp, 317 Broderick St., San Francisco, $749,872. Bids 12/13. CD 12/18—ENR 12/21, under LB.

★†**Calif., Pacific Beach (sta. San Diego)**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 56 bldgs. containing 224 family war dwelling units, Calif. 4914 N, to Harvey & Rose, 211 W. Orange Grove Ave., Arcadia, **$620,000.** Bids 12/13. CD 12/4—ENR 12/7.

†**Calif., San Bernardino**—Public Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 40 bed isolation ward at San Bernardino County Hospital, Calif. 4-404, to Stronach Constr. Co., 115 N. Robertson Blvd., Los Angeles, **$196,996.** Bids 11/14. CD 11/16—ENR 11/23, under LB.

★†**Calif., San Diego**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 232 unit family dwellings, etc., Calif. 4903-N Logan, near here, to Dentzel & Whyte, 825 S. State St., Alhambra, **$612,575.** Bids 11/24. CD 12/1—ENR 12/7, under LB.

†**Calif. Wilmington** — Housing Auth. of Los Angeles, 1401 E. 1 St., Los Angeles, fireproofing 2 housing, Calif. 4109 and 4302, to Baruch Corp., 625 S. Olive St., Los Angeles, **$189,237.** A. Wilson, 816 W. 5 St., Los Angeles, archt. Bids 12/8, awarded 12/13.

†**Minn., Fort Snelling (br. St. Paul)**—U. S. Eng., 1709 Jackson St., Omaha, Neb. cold storage bldg. and food processing plant, to Sauers Const. Co., 1545 Larpenteur Ave., St. Paul, **$45,700.**

†**N. Y., New York**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash. 25, D. C., 4 warehouses at New York, New Haven & Hartford R. R. yards, near Pelham Bay Park, to Corbetta Constr. Co., 220 E. 42 St., New York, Zone 17, **$244,300.**

★†**Tex., Karnack**—Monsanto Chemical Co., 1700 S. 2 St., St. Louis 4, Mo., increasing capacity of Longhorn Army Ordnance plant, to Esslinger-Misch Co., 159 E. Columbia St., Detroit 1, Mich. Est. **$8,500,000,** will equip. Defense Plant Corp. will finance. CD 11/21—ENR 11/23.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Duarte—Los Angeles Sanitorium, 208 W. 8 St., Los Angeles, plans by M. Maltzman, 3017 Buckingham Rd., B. Wiseman, 5927 Franklin Ave. and H. Herzog, 1756 W. 3 St., all of Los Angeles, tuberculosis hospital expansion, incl. moving existing and constructing new bldgs., utilities.

Wash., Bellingham—St. Luke's Hospital, Jersey and Chestnut Sts., nurses home. $150,000. Seeking FWA funds.

Wash., Seattle—Medical Security Clinic, Securities Bldg., Zone 1, clinic bldg., 9 Ave. and Madison St. $250,000.

★**Alta., Calgary**—Alberta Housing Association, Ltd., Edmonton, 125 houses. $500,000.

★**Alta., Edmonton**—Alberta Housing Association Ltd., Edmonton, 125 houses dwellings. $500,000.

Ont., Alexandria Bay (Thousand Islands)—Canada Steamship Lines, Ltd., 715 Victoria Sq., Montreal, Que., plans by D. Shennan, 542 Canada Cement Bldg., Montreal, Que., hotel. CD 12/15.

Ont., Hamilton—W. Townsend, 62 Weir St. N., 35 brick residences, concrete block fdns., Belvedere Ave. $157,500.

Ont., Ottawa—Grace Salvation Army Hospital, 1156 Wellington St., hospital wing. $200,000.

Ont., Toronto—L. Lankin, 43 Thorncliffe Ave., bungalows. $150,000.

Que., Collinsville (Postal Dist. Sherbrooke)—Our Lady of the Rosary R. C. Parish, Collinsville, church. $150,000.

Que., Giffard—Reverend Clercs de St. Viateur, Giffard, boys reformatory. $150,000.

Que., La Malbaie—Reverend Marist Brothers, La Malbaie, school and residence. $150,000.

Que., Montreal—Salvation Army, 1225 University St., home for aged people. $150,000.

BIDS ASKED

Bids Asked January 5

Md., Cheltenham—Bd. Governors, Cheltenham School for Boys, Cheltenham, staff quarters. Plans deposit $10. Ross & Walton, 5223 Baltimore Rd., Hyattsville, archts.

CONTRACTS AWARDED

Calif., Burbank—Jones-Howard Corp., c/o Norstrom & Anderson, archts., Insurance Exchange Bldg., Los Angeles, 1 story, mezzanine, 50x115 ft., 2 story, 80x115 ft., 1 story, 70x115 ft., and 2 story, 50x115 ft., brick, concrete store bldgs., Magnolia Blvd. between Hollywood Way and Cordova St. Owner builds. **$250,000.**

★**D. C., Wash.**—Du Pont Park Apartments, Inc., c/o J. T. Simons, Atty., Lewis Tower Bldg., Phila., Pa., 77 unit—333 unit Du Pont Apartments, to Wark & Co., 1700 Sansom St., Phila., Pa. **$1,750,000.** H. W. Warwick & E. D. Stevens, 4000 Cathedral Ave. N.W., archts.

★**Que., Quebec City**—Hospital St. Francois D'Assisi, 455 1st Ave., hospital addn., to Emile Frenette, Ltd., 75 St. Laurent St., about **$800,000.** CD 9/7—ENR 9/14.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ark. Malvern—PLANT—Acme Brick Co., Malvern, rebuilding plant. Over $40,000.

Calif., Bellflower — FACTORY — Nodco Products Co., c/o W. Dedrick, archt., Heartwell Bldg., Long Beach, 82 x 144 ft., prefabricated welded steel frame factory. $50,000. D. Erb, Ocean Center Bldg., Long Beach, engr.

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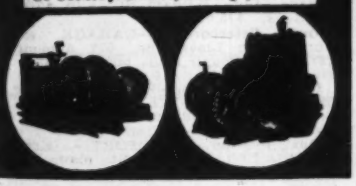
20 So. Hoyne Ave., Chicago, Illinois



Processing PENICILLIN *and* BLOOD PLASMA *with the aid of Deming Pumps*

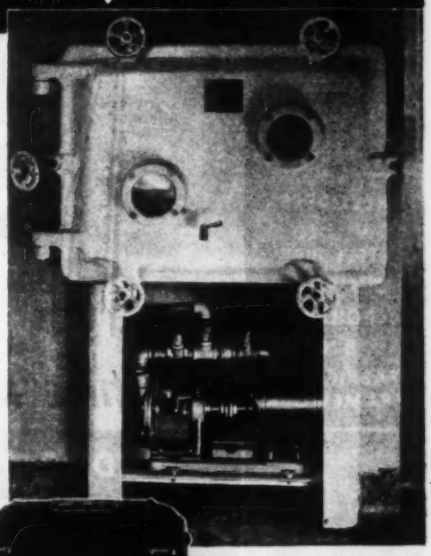


Photo at right shows one of the autoclaves, or drying ovens, used in processing *penicillin* and also *blood plasma* in two separate plants of the Ben Venue Laboratories, Inc., at Bedford, Ohio.

Bottles of the frozen penicillin are placed in the drying oven and the Deming Pump circulates cold alcohol until all moisture is condensed. Then the pump circulates hot alcohol until the rapid evaporation dehydrates the penicillin.

A similar method is used in the dehydration of blood plasma, excepting that water is used instead of alcohol.

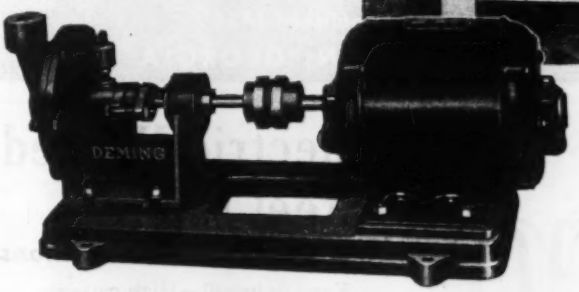


Photo at left shows a Figure 3910 Deming Side Suction Centrifugal Pump used in each autoclave for dehydrating penicillin and blood plasma.

Deming Pumps play an important part in the processing of the "wonder drug" *penicillin* and equally vital blood plasma at Ben Venue Laboratories, Inc., at Bedford, Ohio.

In the process of dehydrating both penicillin and blood plasma, preparatory to packaging, the materials are placed in autoclaves or drying ovens, each unit equipped with a Figure 3910 Deming Side Suction Centrifugal Pump.

Another type of Deming Pump—a Figure 4700 Deep Well Turbine—is used at Ben Venue Laboratories for water supply. This pump reduces water costs approximately 33⅓% under the municipal rates on the volume of water obtained from the well.

When YOU have a pumping problem—either in connection with using pumps as component parts of other equipment—or as separate units—or for water supply, Deming and the Deming Distributor in your vicinity will help you to the correct applications of Deming Pumps. Write THE DEMING COMPANY, SALEM, OHIO.

DEMING

THE COMPLETE LINE

PUMPS AND WATER SYSTEMS

The Deming Company · Salem, Ohio

R.D. COLE QUALITY

TANKS
TOWERS
STANDPIPES
STACKS
KIERS
KETTLES
VATS
AIR RECEIVERS
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BOILERS
BINS
FABRICATED FRAMEWORK

MARITIME "M" MERIT AWARD

Tank Builders for over 80 Years

R. D. COLE MFG. CO.
Established 1854
NEWNAN, GEORGIA

ALCO

Electric Welded Steel Pipe...
For Permanent Installations
Easy to install—High capacity
Thoroughly dependable

American Locomotive
ALCO PRODUCTS DIVISION
30 Church Street, New York 8, N. Y. • Dunkirk, N. Y.

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WITH 'COMPLETE' WELLPOINTS

☆☆ GROUND WATER — the first hurdle the construction engineer must lick—is merely routine step number one, if patented "Complete" Wellpoints are on the job.
Sale or Rental. Call "Complete" and forget your water problems.
2 to 5 Stage Jetting Pumps Available.

COMPLETE MACHINERY & EQUIPMENT CO. INC.
Long Island City 1, N. Y.
BRANCH WAREHOUSE—Gary, Ind.

INDUSTRIAL BUILDINGS (Proposed Work, Cont'd.)

Ill., Jacksonville — MILL, etc. — Morgan Milling Co., 116 N. East St., 150,000 bu. soy bean mill and storage plant, Henry St. and Alton R. R. $120,000.

Mass., Cambridge—WAREHOUSE—United Distributors, 281 Vassar St., plans being completed by B. Mion, 3030 Tennyson Ave. N.W., Wash., D. C., brick warehouse, incl. officers, Memorial Dr. Over $40,000.

Mich., Detroit—PLANT—Detroit Brass & Malleable Works, 100 S. Campbell St., brick, steel, concrete plant addn. $272,800.

Mich., Royal Oak—PLANT—Beaver Tool & Engineering Corp., Royal Oak, brick, steel, concrete plant. $78,500.

N. C., Greensboro — PLANT — Container Corp. of America, I. C. Keller, Vice-pres., Greensboro, mfg. plant. $250,000.

Pa., Marcus Hook—PLANT—General Chemical Co., H. W. Winters, ch. engr., Marcus Hook, F. R. Scheranger, purch. agt., 40 Rector St., New York, N. Y., plans nearing completion by O. Fisher, 103 Park Ave., New York, N. Y., and bids soon general contract mfg. plant alterations, imprvs. $50,000.

Pa., Phila.—PLANT—Service Supply Corp., 20 and Venango Sts., preparing plans rebuilding mfg. plant. $100,000 or more.

Ont., Toronto—PLANT—Aro Equipment of Canada, Ltd., c/o J. Ballon, 38 W. King St., plant. $50,000.

Ont., Toronto—PLANT—Arrow Hart & Hegeman Canada Ltd., 7 Industry St., electric wiring devices mfg. plant. $40,000.

Ont., Toronto — DIAMOND DRILLING — Malga Porcupine Gold Mines, Ltd., 85 W. Richmond St., diamond drilling. $60,000.

Ont., Toronto — DIAMOND DRILLING — Mallen Red Lake Gold Mines, Ltd., c/o M. P. McDonald, engr., 371 Bay St., diamond drilling in Red Lake Area. $60,000.

Ont., Toronto — DIAMOND DRILLING — Paramaque Mines, Ltd., c/o W. G. Chipp Excelsior Bldg., diamond drilling. $100,000.

★**Pa., Phila.**—STORAGE PLANT—Supplee Wills Jones Milk Co., 1523 N. 26 St., storage plant alterations, addns. $500,000.

Pa., Phila—GRAIN ELEVATOR—Tidewater Mill & Elevator Co., P. Hawkins, supt., 3040 Market St., repairing grain elevator, wood, corrugated iron. $100,000.

R. I., Smithfield—PLANT—City Brass Foundry, 152 Transit St., Woonsocket, indefinitely postponed construction brick, steel plant, Louisquisset Turnpike. $40,000. Oliver W. Fontaine, Inc., 285 Main St., Woonsocket, archt. CD 10/5—ENR 10/12.

Tex., Weslaco—PLANT—Gulf Fruit & Vegetable Co., Weslaco, 1 and 2 story, brick, rein.-con., metal processing plant. $45,000.

Tex., Weslaco—PLANT—Verhalen Inc., Weslaco, citrus and vegetable packing plant. $45,000.

Alta., Calgary—FACTORY—G. R. Coulson, 220—12 Ave., factory, 10 Ave. W. $40,000.

Alta., Calgary — PLANT — R. C. MacWilliams, 1640 14 Ave. W., dry cleaning, etc. plant, 17 Ave. W. $40,000.

Alta., Lethbridge — BAKERY — McGavin Bakery Ltd., 14 2 Ave. N., bakery. $40,000 plus equip.

B. C., Vernon—BUS TERMINAL, etc.—Vernon Salmon Arm Coach Lines, 35 N. 12 St., Vernon, bus terminal, garage, etc. $40,000.

N. S. Halifax—PLANT—Provincial Builders Supply Ltd., c/o J. V. MacPherson, Bayers Rd., Halifax, plant and railroad spur. $60,000.

N. S., Halifax—MILL—Syndicate, c/o Hon. Harold Connolly, Ministry of Industry, Halifax, flour and feed mill. $75,000.

N. S., Kingston—COLD STORAGE—Bluenose Fruit Co. Inc., Kingston, cold storage plant. $40,000.

N. S., New Glasgow—PLANT—Malagash Salt Co., Ltd., New Glasgow, pilot plant for making salt by flotation. $50,000 or more.

N. S., New Glasgow—SHOP—Matheson & Co. Ltd., 7 N. Proost St., boiler making shop and foundry. $40,000.

Ont., Amherstburg — BAKERY — Marra's Bakery, Amherstburg, bakery addn., etc. $50,000.

Ont., Hamilton — PLANT — Otis-Fenson Elevator Co. Ltd., Victoria Ave. N., reconstructing elevator division bldg. at plant. $77,000.

Ont., Kitchener—PLANT—J. M. Schneider, Ltd., Courtland Ave. E., plant addn. $75,000.

Ont., Oshawa—KILN—General Motors of Canada, Ltd., William St., kiln addn., alterations. $75,000.

Ont., Peterborough—GARAGE, etc.—De Nure Coach Lines, Inc., 577 Armour Rd., garage and repair shop, bus terminal. $45,000.

Ont., Port Arthur—PLANT—Thunder Bay Canoe Co. Ltd., c/o L. J. McComber, Port Arthur, canoe and small water craft mfg. plant. $40,000.

Ont., Preston — FACTORY — Krallinator Products Ltd., Hamilton St., plans by C. M. Fouse, Preston, 1 story, brick factory addn. $40,000.

INDUSTRIAL BLDGS. (Cont'd.)

Ont., Toronto — PLANT — Powertronic Equipment Ltd., c/o G. Ruel, 51 W. King St., plant. $40,000.

Ont., Windsor—PLANT—Star Publishing Co., Ltd., 167 Ferry St., plans by A. H. McPhail, Canada Bldg., plant addn. $40,000. CD 1/19.

Ont., Windsor — PLANT — Windsor Mattress & Equipment Co. Ltd., mattress, bed and bedding, etc. mfg. plant. $40,000.

Que., Montreal—BUS GARAGE, etc.—Montreal Tramways Co., 159 W. Craig St., bus garage and repairs. $75,000.

Que., Vaudreuil—FLAX MILL—Cooperative des Producteurs de Lin Dorion, Vaudreuil, flax mill. $45,000.

BIDS ASKED

Bids Asked After January 1

★**Tex., Houston**—PLANT—Converted Rice Co., c/o G. L. Harwell & F. E. Mars, 2001 9 St., expanding rice production plant, etc. $1,800,000 loan made by Smaller War Plants Corp. CD 11/20—ENR 11/23.

Bids Asked January 4

La., New Orleans—STORAGE IMPROVEMENTS—Stone Brothers, archts., Carondelet Bldg., remodeling office and storage space and flour storage, incl. electrical work, new sprinklers, for American Bakeries Co., Inc., 3101 Tulane Ave.

Bids Asked January 2

Miss., Philadelphia—FACTORY—Wells-Lamont Corp., Philadelphia, 1 story glove factory. $80,000. N. W. Overstreet, 201 W. Lamar St., Jackson, archt.

Bids Asked After January 15

Tex., Burnet—PLANT—H. M. Clements, Burnet, frozen food locker and processing plant. Paul G. Bentley & Co., 407 Burt Bldg., Dallas, engrs.

Bids Asked About January 15

Tex., Johnson City—PLANT—Dr. Ed. Keley, sponsor, Johnson City, frozen food locker and processing plant. Paul G. Bentley & Co., 407 Burt Bldg., Dallas, engrs.

CONTRACTS AWARDED

Ala., Anniston—FREIGHT DEPOT—Southern Ry. System, B. Herman, ch. engr., McPherson Sq., Wash., D. C., freight depot, to Brice Bldg. Co., 215 18 St. S., Birmingham. $70,000.

Ala., Decatur—PLANT—TVA Fertilizer Coop., Decatur, seed cleaning and storage plant, to Armco Culvert & Pipe Co., Forsyth Bldg., Atlanta, Ga., $50,000.

Ala., Montgomery—STOCKYARD, etc.—Capital Live Stock Co., 411 Furnace St., stockyard, incl. office bldg., to Bear Lumber Co., 400 Lee St., $96,000. Bids 12/13. C. C. Pearson, 1st Natl. Bank Bldg., archt.

Conn., New Britain—FACTORY—Stanley Works, 195 Lake St., 1 story, 35x180 ft. factory, Burritt St. Owner builds. $41,000.

Del., Claymont—PLANT—General Chemical Co., H. W. Winters, ch. engr., Marcus Hook, Pa., F. A. Scherzinger, purch. agt., 40 Rector St., New York, N. Y., mfg. plant alterations, to Rupert Constr. Co., 1501 French St., Wilmington, $45,000. Awarded 12/12. O. Fisher, 103 Park Ave., New York, N. Y., archt.

★**Mass., Chelsea (br. Boston)**—FACTORY—Panther-Panco Rubber Co. Inc., 31 Highland St., 3 story, 70 x 95 ft., and 1 story, 148 x 537 ft. and 75 x 97 ft., brick, steel factory, to McCutcheon Co., 250 Stuart St., Boston. Est. $615,000. CD 12/5—ENR 12/7.

Mass., Somerville—FACTORY—Dahlquist Mfg. Co., 628 Somerville Ave., 1 story, 200x200 ft. factory, to Louis Martiniello & Son, 49 Dighton St., Brighton. Est. $60,000. C. Goldberg, 702 Beacon St., Boston, archt.

Mich., Detroit—FACTORY, etc.—General Magnetic Corp., 2128 E. Fort St., 1 story, brick, steel, concrete mfg. plant and office, to L. E. Kuhlman, 16206 E. Warren Ave. Est. $75,000.

N. H., Manchester—PACKING PLANT—Granite State Packing Co., 163 Hancock St., 1 story, brick, steel packing plant addn., to Leon Kyser Co., 507 Elm St. Est. $40,000. CD 9/12—ENR 9/14.

Pa., Phila.—PLANT REPAIRS—Reading Co., E. Y. Allen, ch. engr., Reading Terminal, Phila., Zone 7, repairs and new construction at 3 story mfg. bldg., to Lamb Bldg. Corp., 1001 Wood St., $65,000. Bids 12/9, awarded 12/14. CD 12/7—ENR 12/14.

R. I., Providence—PLANT—Narragansett Electric Co., 49 Westminster St., remodeling steam station, power plant, to A. C. Beals Co., 63 Bassell St. Est. over $40,000.

R. I., Providence—MILL—Paragon Worsted Co., 39 Manton Ave., 2 story textile mill. Owner builds. $40,000. CD 6/29—ENR 7/6.

Tex., Pharr—PLANT—Gulf Produce Co., Pharr, 1 story citrus and vegetable packing plant, day labor, $42,000. CD 12/12—ENR 12/14.

UNCLASSIFIED

PROPOSED WORK

Ark., Little Rock—LIVESTOCK SHOW FACILITIES—State Live Stock Show Assn., c/o C. Byrd, Smackover, plans by Erhart & Eichenbaum, Gem Bldg., show ground and facilities for livestock show. $175,000.

UNCLASSIFIED

†Calif., Skaggs Island (br. Sonoma — RADIO STATIONS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., engineering-architect services by W. D. Peugh & Associates, 333 Montgomery St., San Francisco, supplemental radio stations, Naval Radio Recreation and Control Station.

Conn., Bridgeport—LIGHTING—City, J. McLevy, mayor, City Hall, replacing 1,686 units street lighting, various streets, C. R. Turner, 1115 Broad St., engr.

Conn., Fairfield—FIRE ALARM SYSTEM—Town, Bd. Fire Comrs., 100 Reef Rd., town-wide fire alarm sys., incl. separate central switchboard. $60,000.

R. I., Little Compton—BATHHOUSES—K. Clark, Warren Point, Little Compton, indefinitely postponed taking bids reconstructing 135 bathhouses, Warrens Point. $25,000. CD 11/6—ENR 11/9.

Texas—OIL PIPELINE—Gulf Refining Co., Gulf Bldg., Houston, 55 mi. 8- to 10-in. crude oil pipeline, Midland area, Midland Co. $175,000.

†Tex., Galveston—RELOCATING RADIO RANGE—U. S. Eng., Avenue F and 25 St., Galveston, relocating radio range at Army Airbase. $25,000.

Tex., Love Field (br. Dallas)—AIRFIELD IMPROVEMENTS—City of Dallas, Dallas, airfield imprvs., incl. grounds expansion and imprvs. for blind landing, etc. at Love Field, $100,000.

Alta., Highway—RAILROAD, etc.—Highwood Coal Mines Ltd., Highway, railroad to connect mining properties with Transcontinental Rail Transportation, $100,000; coal mine development, incl. necessary bldgs. $75,000.

N. S., Bridgewater—AIRPORT—Municipality, airport. $100,000.

LOW BIDDERS

★**†Fla., MacDill Field (br. Tampa)**—RUNWAYS, etc.—U. S. Eng., Post Office Bldg., Savannah, Ga., Dec. 12, grading, paving, drainage facilities, grassing, from W. L. Cobb Inc., 1102 22 St., Tampa, asphalt $559,000, concrete $616,000. CD 12/15—ENR 12/21.

Ill., Chicago—SHORE PROTECTION—Chicago Park Dist., 425 E. 14 Blvd., shore protection, Lake Michigan Shore line, Ohio St. to North Ave., from Paschen Contractors, 2739 Elston Ave., $384,337.

CONTRACTS AWARDED

†Calif., Terminal Island—DOCK REPAIRS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., repairing private docks, Naval Air Station, NOY 11194, to Hull, Smale & Robinson, Inc., 1033 Avalon Blvd., Wilmington. $133,485.

†Ia., Clinton—ALARM SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, Neb., nurses signal calling and low voltage alarm sys. at Schick General Hospital, to Wilson Electric Co., 113 S. Madison St., Rockford, Ill., $28,658.

†Kan., Salina—APRON—U. S. Eng., 10 E. 17 St., Kansas City, Mo., addnl. apron, to Harrison Eng. & Const. Corp., 4638 Mill Creek Parkway, Kansas City, Mo., $103,889.

Mass., Fall River—WHARF—Tidewater Assoc. Oil Co., 194 Elm St., wharf, timber dock and dolphin, to Elliott & Watrous, Inc., Crest Ave., East Providence, R. I., $35,000.

Minn., Minneapolis — HANGAR — Metropolitan Airports Comn., R. Aldrich, dir., 2429 University Ave., St. Paul, 2 story, 57 x 100 ft., brick, concrete, hangar addn., for shop exten. at Wold-Chamberlain airport, to Naugle-Leck, Inc., 522 Roanoke Bldg., $49,750. Mid-Continent Airlines, Inc., 6501 34 Ave. S., lessee. CD 9/13—ENR 9/21.

†N. M., Kirtland Field (br. Albuquerque)—AIRFIELD EXTENSIONS—U. S. Eng., 4 and Gold Sts., Albuquerque, exten. aprons, hangar turnouts, etc., involving 84,000 sq. yd. paving, 24,000 cu. yd. excav., to M. M. Sundt Constr. Co., Albuquerque, $176,000, est. $60,000; firing range, to Shuffleberger Constr. Co., Albuquerque, $33,196. CD 11/21—ENR 11/30.

R. I., Newport—MARINE RAILWAY—Tallman & Mack Fish & Trap Co., Spring Wharf, Newport, marine railway, to Elliott & Watrous, Inc., Crest Ave., East Providence, $39,000.

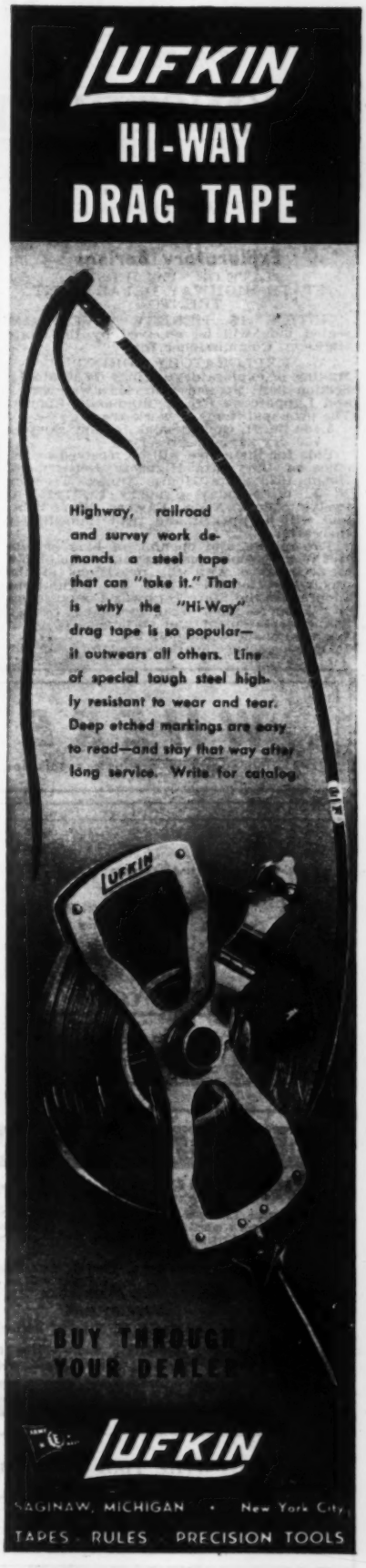
R. I., Providence—WHARF—Tidewater Assoc. Oil Co., Dexter Rd., East Providence, timber wharf and dolphin, to Elliott & Watrous, Inc., Crest Ave., East Providence. $30,000.

Texas—PIPELINE—Texas-New Mexico Pipeline Co., 720 San Jacinto St., Houston, laying 30 mi. 12 in. pipeline in 5 separate loops between Crane and Houston, to Midwestern Engineers, Drew Bldg., Tulsa, Okla., $110,000. CD 12/14—ENR 12/21.

†Tex., Brooks Field (br. San Antonio)—SIGNALLING SYSTEMS—U. S. Eng., Fort Sam Houston, nurses signalling systems, to Paul Wright Electric Co., 419 E. Martin St., San Antonio, $28,977.

†Wash., Pasco—STEAM DISTRIBUTION SYSTEM—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., steam distr. sys. addn., Naval Air Station, NOY 11139, to Pasco Plumbing & Heating Co., 413 Clark St., $58,000.

Proposal Advertisements see p. 140
Postwar Projects see p. 97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CONSTRUCTION BY CONTRACT

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC. - MUNSEY BLDG., WASH. D.C.

OFFICIAL PROPOSALS

Bids: Jan. 15 (338)

Exploratory Borings

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

EXPLORATORY BORINGS

Making of exploratory borings on Route 35, Section 39A, at and near Matawan Creek and Luppatcong Creek, Monmouth County. The principal items of work are:

3,400 lin. ft. casings sunk for dry samples
450 dry samples preserved

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Monday, January 15, 1945, at twelve o'clock Noon, Eastern War Time, and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner

OFFICIAL PROPOSALS

Bids: Jan. 2 (334)

Notice to Equipment Contractors

FEDERAL WORKS AGENCY
PROJECT CONN. 6-104

The City of Hartford, Owner

Separate sealed bids for EQUIPMENT, including Kitchen Equipment, Hospital Furniture and Equipment, Patients' Furniture, Office and Class Room Furniture, Sterilizers, Operating Table and Operating Lights, and Textiles, for the Isolation Hospital Building at the Municipal Hospital, 2 Holcomb Street, Hartford, Connecticut, F.W.A. Project Conn. 6-104, will be received by the Board of Contract and Supply, City of Hartford, at the office of the Mayor, Municipal Building, 550 Main Street, Hartford, Connecticut until eleven-thirty (11:30) o'clock A. M., Eastern War Time, Tuesday, January 2, 1945, and then at said office, publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Specifications, and Forms of Bid and Performance Bonds may be examined at the office of the Architect, Ebbets & Frid, 15 Lewis Street, Hartford, Connecticut, and copies thereof obtained upon payment of Ten Dollars ($10.00) for each set. Any bidder, upon returning such set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such a set will be refunded Five Dollars ($5.00).

The City of Hartford reserves the right to waive any informalities in or to reject any or all bids not deemed to the interest of the City.

Each bidder must deposit with his bid security in the amount of ten per cent (10%) of his bid in the form and subject to the conditions provided in the Information for Bidders.

No bidder may withdraw his bid within 30 days after the actual date of the opening thereof.

A satisfactory surety bond for 100% of the contract price will be required of the successful bidder.

BOARD OF CONTRACT AND SUPPLY
By M. Cole Kennedy,
Date—December 15, 1944 Secretary.

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Featuring additional products, specialties, and services for the Construction Industry

STEEL AND HEAVY WOOD CONSTRUCTION AND HEAVY RIGGING OF ALL TYPES.

Karl Koch Erecting Co. Inc.
362 Casanova St. Bronx 59, N. Y.
Dayton 9-7474

IMMEDIATE DELIVERY

UNIVERSAL Level-Transit

Telescope 12" long, 25 power—Horizontal Circle 4½" with vernier to 5 minutes—Vertical Arc 3"—Clamp and Tangent Screw for Vertical and Horizontal Limb—Instrument weighs 11 pounds, tripod 9 pounds.

Price complete with Tripod, Carrying Case, Sunshade, and Dust Cap $115.00. Can be furnished with a compass at $12.50 extra—Stadia Wires $5.00 extra.

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DAVID WHITE CO. 303 W. COURT STREET MILWAUKEE 12, WIS.

Notice to Advertisers

Because of the Holiday, New Year's Day, January 1st, the "Searchlight" pages of the

JANUARY 4th ISSUE OF

Engineering News-Record

close for press earlier than the usual weekly closing time.

The cooperation of advertisers is solicited in forwarding new copy, or changes of copy, to reach us accordingly.

FINAL CLOSING TIME
Proposals and Undisplayed Ads:
Friday 10 A.M., December 29th.

Let Us Write Your Contract Bonds

THE ÆTNA CASUALTY and SURETY COMPANY
HARTFORD CONNECTICUT

Agents From Coast to Coast

Construction Trends

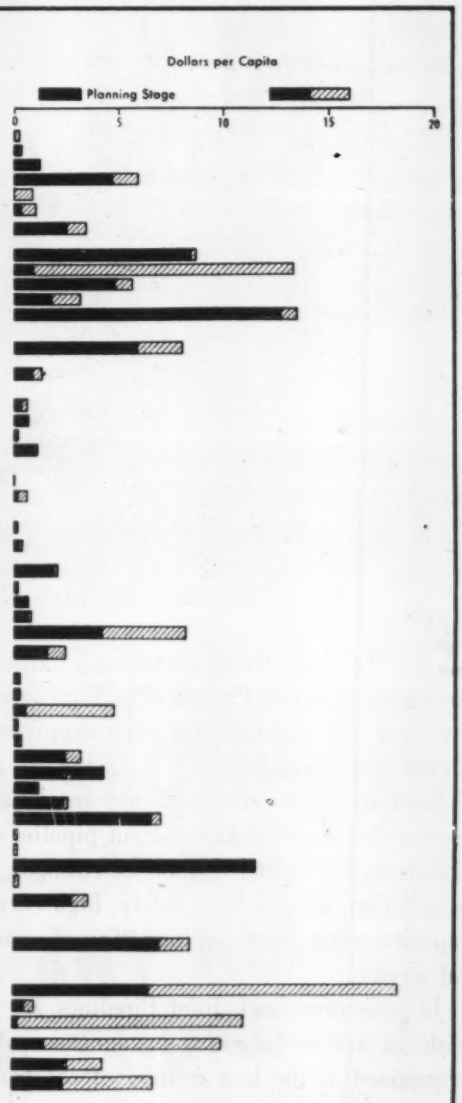
POSTWAR WATERWORKS PLANNING PROGRESS

Twenty-three-month 1943-1944 Volume of Waterworks Projects Proposed and Plans Started – by States – as Reported to Engineering News-Record

Totals are Thousands of Dollars—000 omitted

	Proposed Waterworks Construction Total	Proposed Waterworks, $ Per Capita	Planning Stage Waterworks Total	Planning Stage Waterworks, $ Per Capita	Waterworks Planning as % of Proposed	Total Estimated Waterworks Need*	Proposed as % of Est. Need
Maine	$295	$0.35	$50	$0.06	17	$2,060	14
New Hampshire	220	.45	135	.27	61	440	50
Vermont	435	1.21	435	1.21	100	2,860	15
Massachusetts	25,426	5.89	20,281	4.70	80	20,830	122
Rhode Island	645	.91	–	–	–	10,140	6
Connecticut	1,740	1.02	550	.32	32	3,310	53
New England	**28,761**	**3.41**	**21,451**	**2.55**	**75**	**39,640**	**72**
New York	116,845	8.67	113,571	8.43	97	37,810	309
New Jersey	55,122	13.27	3,750	.90	7	6,650	830
Pennsylvania	55,646	5.63	47,791	4.83	86	36,140	154
Maryland	5,704	3.14	3,200	1.76	56	47,230	12
Dist. of Columbia	8,897	13.42	8,402	12.68	95	12,000	74
Delaware	–	–	–	–	–	890	–
Middle Atlantic	**242,214**	**8.00**	**176,714**	**5.83**	**73**	**140,720**	**172**
Virginia	3,487	1.30	2,244	.84	64	4,500	78
West Virginia	–	–	–	–	–	3,150	–
North Carolina	2,067	.58	954	.27	46	11,860	17
South Carolina	1,300	.68	1,300	.68	100	4,250	31
Georgia	465	.15	440	.14	95	12,760	4
Florida	2,084	1.10	1,831	.97	88	6,860	30
Alabama	–	–	–	–	–	6,910	–
Mississippi	40	.02	40	.02	100	5,550	1
Louisiana	1,537	65	317	13	21	5,680	27
Kentucky	–	–	–	–	–	12,150	–
Tennessee	435	.15	435	.15	100	5,420	8
South	**11,415**	**.40**	**7,561**	**.27**	**66**	**79,090**	**14**
Ohio	14,333	2.08	12,970	1.88	90	39,110	37
Indiana	631	.18	475	14	75	15,790	4
Illinois	4,899	.62	4,601	.58	94	96,260	5
Wisconsin	2,403	.77	1,940	.62	81	21,130	11
Michigan	42,547	8.10	21,834	4.16	51	40,270	106
Middle West	**64,813**	**2.43**	**41,820**	**1.57**	**65**	**212,560**	**30**
Minnesota	650	.23	563	.20	87	11,450	6
Iowa	654	.26	570	.22	87	10,670	6
Missouri	18,029	4.76	2,240	59	12	38,040	47
Arkansas	380	.19	200	.10	53	9,530	4
North Dakota	210	.33	145	.23	69	8,260	3
South Dakota	2,032	3.16	1,559	2.43	77	3,500	58
Nebraska	5,593	4.25	5,573	4.24	100	8,770	64
Kansas	2,010	1.12	1,960	1.09	98	8,260	24
Oklahoma	5,955	2.55	5,530	2.37	93	15,280	39
Texas	44,825	6.98	41,160	6.42	92	13,140	340
Montana	100	.18	–	–	–	1,700	6
Wyoming	45	.18	–	–	–	2,030	2
Colorado	12,849	11.43	12,849	11.43	100	5,720	225
New Mexico	135	.25	–	–	–	1,030	13
West of Mississippi	**93,467**	**3.50**	**72,349**	**2.71**	**77**	**137,380**	**68**
Idaho	–	–	–	–	–	2,920	–
Utah	4,544	8.27	3,714	6.75	82	5,860	77
Arizona	–	–	–	–	–	4,170	–
Nevada	–	–	–	–	–	150	–
Washington	31,543	18.18	10,945	6.31	35	11,140	283
Oregon	1,090	1.00	575	53	53	2,920	37
California	75,128	10.88	1,444	.21	2	46,750	161
Far West	**112,305**	**9.84**	**16,678**	**1.46**	**15**	**73,910**	**152**
United States	**552,975**	**4.20**	**336,573**	**2.56**	**61**	**683,300**	**81**
Canada	**75,283**	**6.59**	**26,662**	**2.34**	**35**	**–**	**–**

*U S Public Health Service Inventory of Additional Water Supply Facilities Needed.



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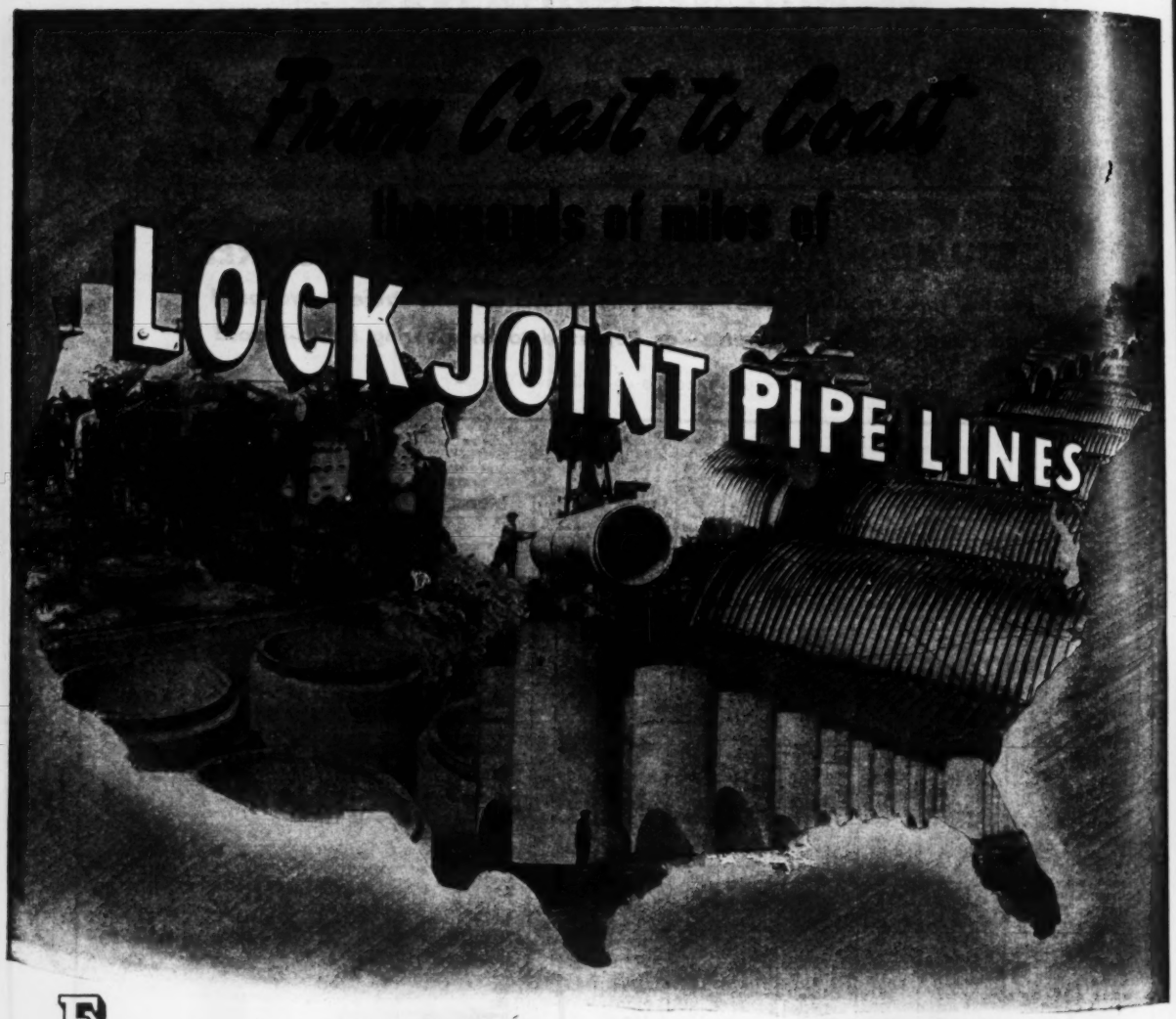


From Portland, Maine to Oakland, California, Lock Joint Concrete Pressure Pipelines have created new high standards for water supply mains for the past 3 decades.

Leading water works engineers are definitely agreed that these highly efficient pipelines can absolutely be depended upon for strength, easy installation, adaptability, safety, high carrying capacity, water-tightness, long life and economical service.

In peacetime Lock Joint Pipelines are built with an eye to long-range programs and are recognized as the best method of constructing large diameter, high pressure water supply mains. In wartime, they offer a 25% to 75% saving of critical materials on 100% critical jobs.

The history of our many installations is the best proof of the lasting qualities built into every mile of Lock Joint Reinforced Concrete Pressure Pipe.

◆ ◆ ◆ ◆

Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

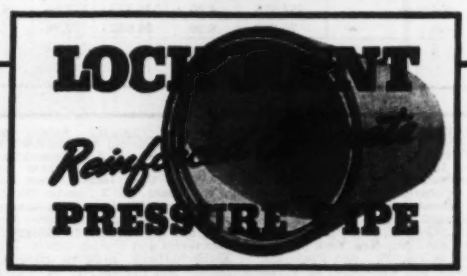
LOCK JOINT PIPE COMPANY

Established 1905

AMPERE, NEW JERSEY

Denver, Colo. · Chicago, Ill. · Kenilworth, N. J. · Kansas City, Mo. · Rock Island, Ill. White Plains, N. Y. · Valley Park, Mo. · Cleveland, Ohio · Hartford, Conn. · Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*



YOU NEVER KNOW

When you'll be in ROCK!

—IF YOU HAVE A REAL ROCK SHOVEL, YOU'LL NEVER HAVE TO WORRY ABOUT ANY KIND OF DIGGING ON THOSE POSTWAR CONTRACTS

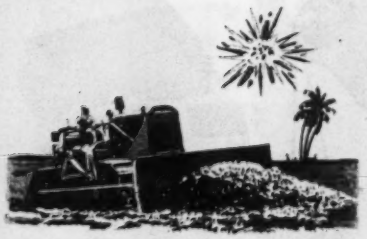
ORTHWEST
INEERING CO.
28 Steger Bldg.
E. Jackson Blvd.
Chicago, Ill.

NORTHWEST

VICTORY
NORTHWEST

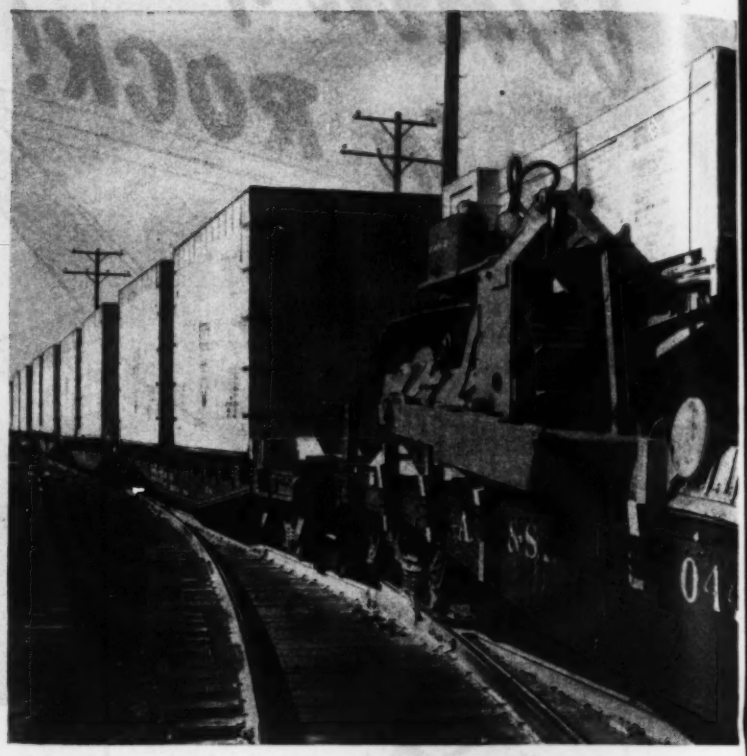
HINES "KNOW HOW"

Gets machines into the fight!

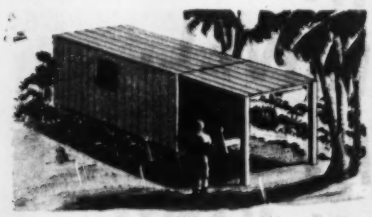


EXPORT BOXES FOR CATERPILLAR . . . . .

For protection in shipment to far-flung fighting fronts, rugged Caterpillar "bull-dozers" are boxed in water-proof containers fabricated, to Army Engineer Corps specifications, by Hines. For this big job, demanding clock-like coordination in lumber supply and manufacturing operations, two production lines in the Edward Hines Lumber Co. Wood Fabrication Plant in Chicago gear Hines "know-how", facilities and equipment to the output of the Caterpillar Tractor Co. in Peoria. The resulting saving in time, effort and money is an outstanding example of Hines' service in expediting the safe delivery of vital equipment to our armed forces all over the world.



. . . and Fit to Fight!



SOUTH SEAS "PREFAB" HOUSE

We're told that after Hines export boxes complete their job of delivering Caterpillar tractors safely, they provide shelter for fighting men . . . a fitting end-use for good lumber!

BOXES FOR TORPEDOES . . . .

Among the many special protective containers, engineered and produced by Hines to meet exacting specifications, were boxes to insure the safe delivery of the delicate propulsion machinery for torpedoes. If you have a production or design problem in wood, get in touch with Hines—we can help you with every phase of the job.

EDWARD HINES LUMBER CO.

CHICAGO, ILLINOIS • ESTABLISHED 1892

Heavy hauls really ROLL on this TIME-PROVED TOUGHER TREAD

GOODYEAR ALL-WEATHER EARTH-MOVERS keep this LaPlant-Choate CARRIMOR working fully up to its name.

MORE AND MORE contractors now buy Goodyear All-Weather Earth-Movers for drawn units because they know that this great work tire gives them maximum flotation — keeps their *heaviest* loads moving free and fast.

That's because the rugged, job-proved All-Weather tread of this BIGGER tire extends over the shoulders *to the center of the sidewalls* —provides side traction, prevents side slip on grades.

Its wider tread channels and rounded, sturdy diamonds assure complete self-cleaning and protection against snagging. And its tougher bead construction provides security against rocking, chafing and rim cutting.

Now super-armored with Goodyear's patented Rayotwist cord—*the strongest body we've ever used in a work tire*—these Goodyear off-the-road giants are by far the finest that can be built from synthetic and permissible natural rubber available today. They deliver more ton-miles of heavy-duty service because they are the longest-lasting, hardest-working tires available.

For proof of that, talk to the men now using them. Once you do, you will want Goodyears on all your units.

THE RIGHT TIRE FOR EVERY JOB
Rayotwist-armored for extra strength

ALL-WEATHER EARTH-MOVER for drawn vehicles
HARD ROCK LUG for all rock work
SURE-GRIP for drive wheels

PRODUCTS OF GOODYEAR RESEARCH

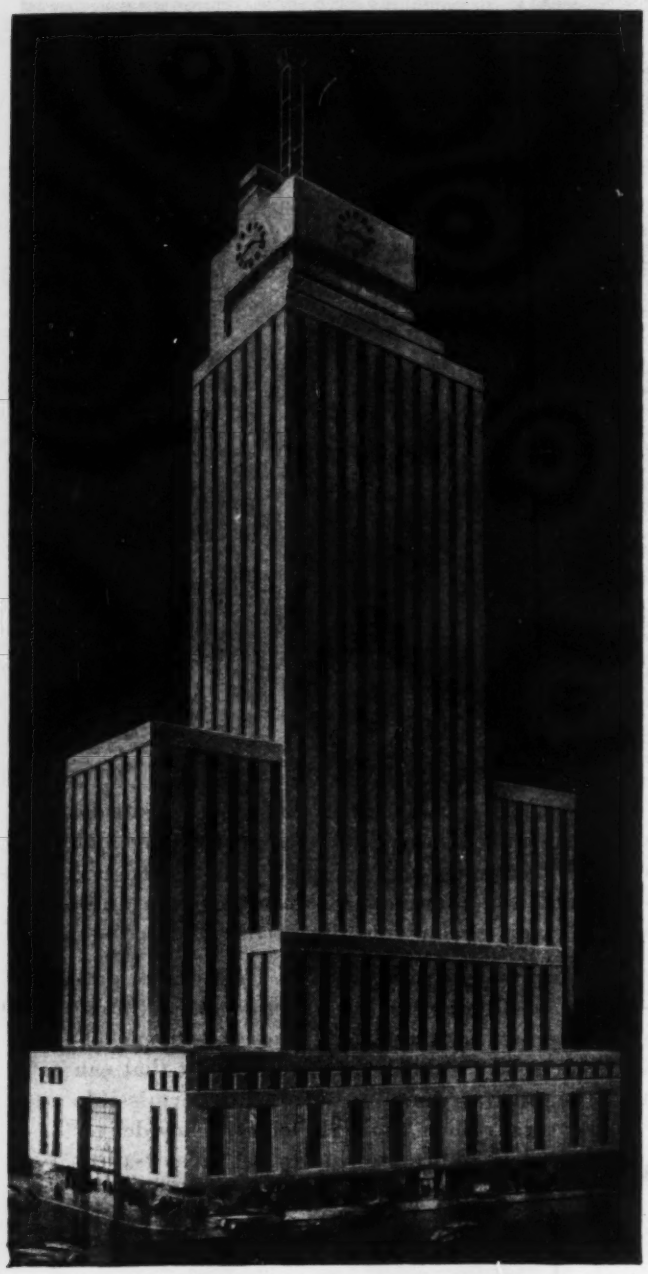
BUY WAR BONDS—BUY FOR KEEPS

All-Weather, Rayotwist, Sure-Grip—T.M.'s The Goodyear Tire & Rubber Company

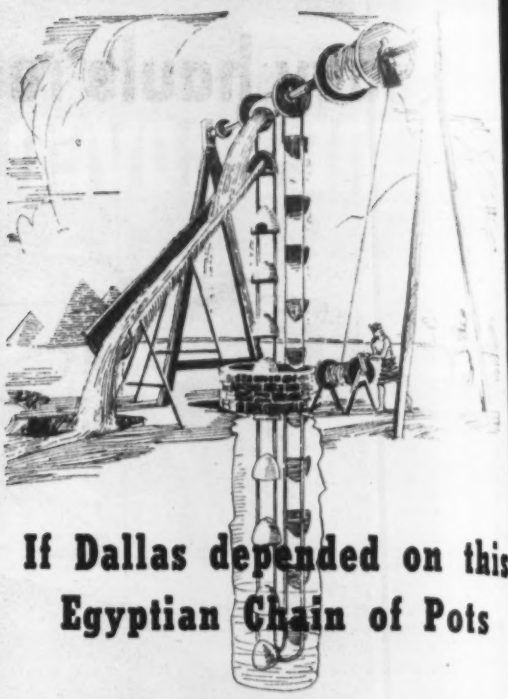
GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND



"City in the Sky"--the Mercantile Bank Building, Dallas, Texas. Youngstown Pipe used for plumbing, heating and air-conditioning. Architect, Walter W. Ahlschlager, general contractor, Henger Construction Co., plumbing sub-contractor, C. Wallace Plumbing Co. -- all of Dallas.



If Dallas depended on this Egyptian Chain of Pots

THE citizens of Dallas take justifiable pride in this new skyscraper . . . the 30-story Mercantile Bank Building.

Yet who appreciates that this "City in the Sky" was possible only because of the availability of modern piping systems--the only practical means to service every floor of its magnificent 30 stories with water.

Imagine what this building, housing thousands of workers, would be like with no water or modern heating facilities. Picture the impossibility of this structure in Ancient Egypt, dependent on the then ultra-convenient chain of earthenware pots to draw water from wells.

In order to live in cities, civilized men must have water close at hand . . . and to have water we must have dependable pipe . . . pipe low enough in cost so that it can be used plentifully, pipe durable enough that it will withstand the ravages of time and the hardships of extraordinary service. Steel pipe is the answer to all of these requirements.

The architect who specified Youngstown Pipe for this job and the contractor who bought and installed it, know of its enviable record in other outstanding installations.

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN 1, OHIO

Manufacturers of

Carbon, Alloy and Yoloy Steels

YOUNGSTOWN

Pipe and Tubular Products - Sheets - Plates - Conduit - Bars - Coke Tin Plate - Electrolytic Tin Plate - Rods - Wire - Nails - Tie Plates and Spikes.

La-a-adie-e-ees 'n' Gen'l'men . . .

We will now demonstrate the ma-a-arvelous strength of New Departure steel balls . .

1. New Departure high carbon chrome steel ball resting on solid steel block.

2. Applying pressure with hydraulic ram, ball on its way into block.

3. It takes 90 TONS pressure to press the ball in to its full diameter.

4. Pressure removed, block is cracked and distorted but the steel ball is still round—and ready for more!

We place the little steel ball on the big steel block. We apply pressure, gradually, increasing until it reaches 180,000 pounds. The ball sinks into the block like a stepped-on marble sinks into the ground and — PRESTO — a ruined steel block and a little steel ball looking 'round for more tests to conquer!

Such tests give one an idea of the toughness . . . the load-carrying ability of such steel balls as they roll in the raceways of New Departure Ball Bearings.

You see, the ball is unique in that it has no ends . . . no weak spot . . . it takes loads equally well from any direction. A fundamental reason why ball bearings are so important in this world!

Would you like to know more about Ball Bearings? We will gladly send you illustrated booklet "BM"— for the asking!

3296

nothing rolls like a ball

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

Bulletin

TO ALL TRUCK OPERATORS AND FLEET OWNERS

FWD Trucks Available for Civilian Purchase on and after Jan. 1, 1945

GOOD NEWS — FWD four-wheel-drive trucks, pre-eminent in war services, with production previously restricted almost exclusively for the military, are soon to be available for motor transport, highway, utility, oil fields, and other essential civilian services.

Recent directive from the WPB provides for production of a substantial number of FWD trucks in a wide variety of models and types, 2½ to 15 tons capacity; such trucks to be built only for essential civilian uses. FWD trucks built under this release will be available for purchase on and after January 1, 1945. Deliveries will be made in keeping with priority of orders as received; immediate action and prompt placing of orders is urgent to assure delivery before limit of production is reached.

Write — wire — or phone us directly, or the nearest authorized FWD dealer for full information and your eligibility to purchase under these new rationing regulations.

FWD TRUCKS

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: KITCHENER, ONTARIO

These and other FWD Trucks 2½ to 15 ton capacity, available to qualified purchasers

Straight trucks in FWD's "H" series range 17,000 to 20,000 lbs. gross vehicle weight capacity with wheelbases from 144" to 154" gasoline engine powered with power plants from 100 to 120 hp and with four-wheel drive.

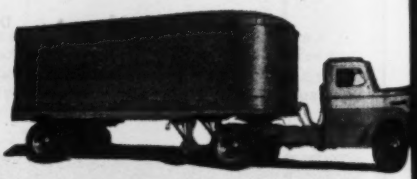
"M" series FWD's powered with either gasoline or diesel engines ranging from 150 to 200 hp and with capacities ranging from 30,000 to 42,000 lbs. gross vehicle weight. Four wheel drive.

"U" series FWD's with gross vehicle weight capacities of 22,000 to 28,000 lbs. Powered with 125 hp gasoline engines, 5 speed transmission, 11:00x20 tires, wheelbase 150". Four wheel drive.

FWD's four-wheel drive Road Maintainer — built for underbody scraper use with extra heavy frame and other features that make it the ideal unit for snow and road maintenance. Engine 115 hp — 5 speed transmission — 8:25x20 dual tires.

Utility Line Construction and Maintenance trucks by FWD with 5 and 7 man cabs, special power-take-offs and line bodies. Powered with 115 hp engine on 144" wheelbase with four-wheel drive, 5 speed transmission, 144" wheelbase and 9:00x20 tires.

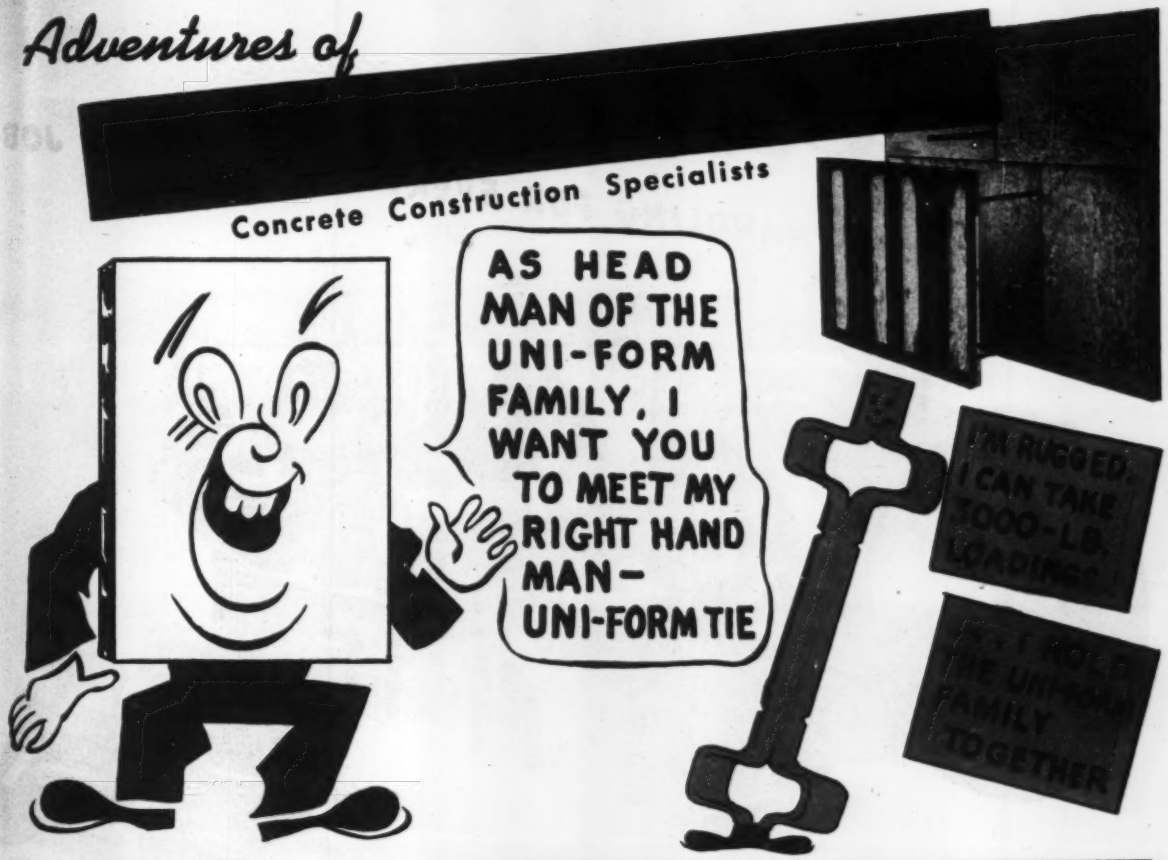
Six-wheel drive FWD trucks with gross vehicle weight capacities of 55,000 lbs. Powered with either gasoline or diesel engines of 150 and 200 hp. Wheelbase from 214½" to 276".

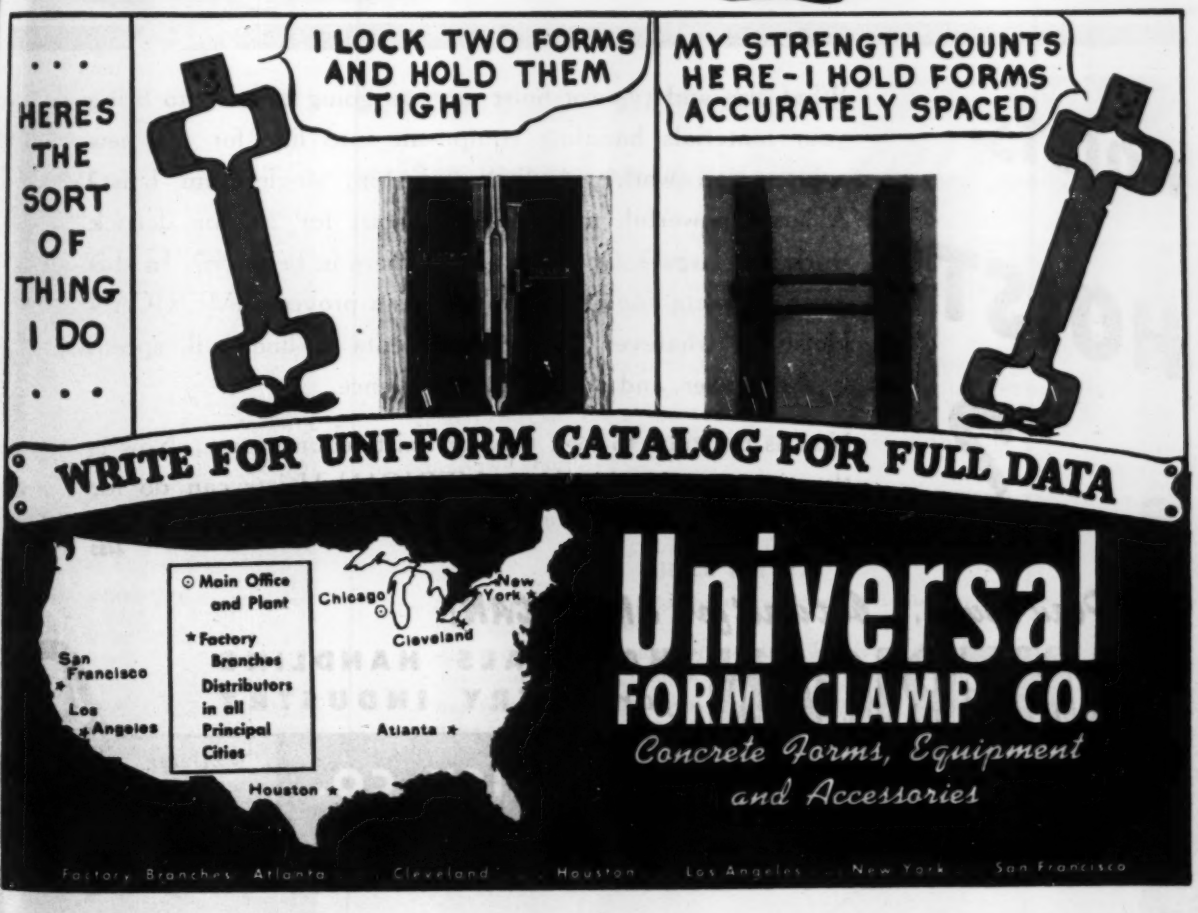


FWD's "H" series tractor trucks with four-wheel drive and gross vehicle weight ratings from 40,000 lbs. to 60,000 lbs. Powered with gasoline engines ranging from 100 to 120 hp on wheelbases from 120" to 144" in conventional or cab-over-engine types.

Adventures of

Concrete Construction Specialists


AS HEAD MAN OF THE UNI-FORM FAMILY, I WANT YOU TO MEET MY RIGHT HAND MAN— UNI-FORM TIE
I'M RUGGED. I CAN TAKE 7000-LB. LOADING
I HOLD THE UNI-FORM FAMILY TOGETHER



WRITE FOR UNI-FORM CATALOG FOR FULL DATA

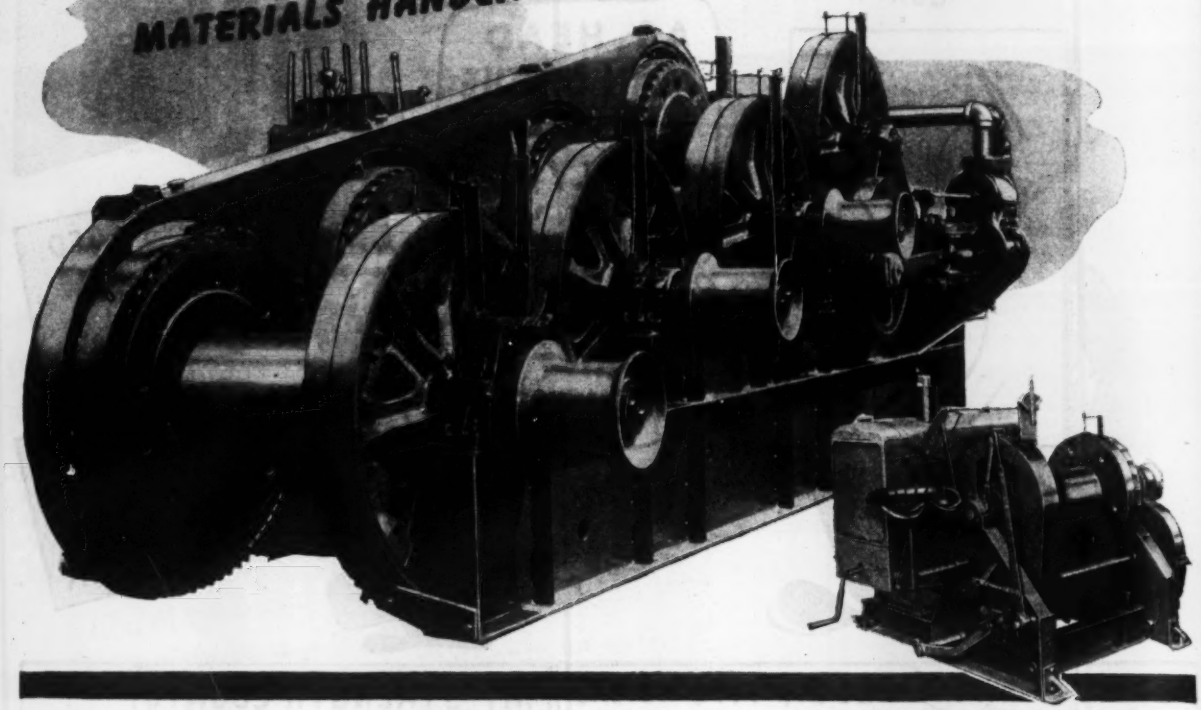
Universal
FORM CLAMP CO.

Concrete Forms, Equipment and Accessories

Factory Branches: Atlanta, Cleveland, Houston, Los Angeles, New York, San Francisco

American

MATERIALS HANDLING FOR EVERY CONSTRUCTION JOB



HOISTS HOISTS ?

What size and type of hoist are you going to need to bring your materials handling equipment into line for the new construction work? A little, one-ton, single-drum hoist? A large, powerful, multiple-drum hoist for 250-ton derrick work and larger? Or a hoist somewhere in between? In this most complete line of hoists, there is a proved, AMERICAN Hoist for whatever your requirements in line pull, speed, type of power, and operating convenience.

Now is the time to look to your hoist requirements. Now is the time to see what the AMERICAN Hoists can do for you later.

4455

Plan now . . . but wait for **AMERICAN!**

AMERICAN MATERIALS HANDLING *for* EVERY INDUSTRY

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

Excessive Ring Wear? Blame a "LAZY" Oil!

Keep your engines on the "GO" with hard-working TALPEX

EVERYTHING seemed to be going along perfectly in the engine from which those rings were taken. Then one day the going got tough . . . engine overheated . . . oil laid down on the job . . . trouble started.

A "lazy" oil simply can't take tough going. For it doesn't have *all* the properties necessary to efficient engine operation. Unfortunately you can't tell a "lazy" oil by looking at it. And by the time you find it is "lazy" you may have an engine condition like the one shown above.

Of this you *can* be sure; Shell Talpex has *all* the properties needed to operate an engine with utmost efficiency.

SHELL TALPEX

— **IS NON-CORROSIVE** to alloy bearings. Protects all lubricated engine parts against corrosion.

— **HAS EXCEPTIONAL OXIDATION STABILITY.** Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

— **HAS HIGH DETERGENCY.** Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

— **HAS LOW CARBON-FORMING TENDENCY.** Reduces ring sticking and wear. Lengthens engine life.

If the oil you now use doesn't have *all* these properties, it's lazy . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

THE ALL-PURPOSE, HEAVY-DUTY LUBRICANT

Why and How to use

PORUS-KROME

Official U. S. Navy Photograph *Official U. S. Navy Photograph*

Why . . .

. . . reduces wear and corrosion
. . . multiplies cylinder life 4 to 20 times
. . . increases ring life 3 to 5 times
. . . improves lubrication
. . . reduces risk of piston seizure
. . . greatly increases engine reliability

How . . .

. . . by having cylinders or liners processed in one of the three Van der Horst plants
. . . by specifying PORUS-KROME cylinders or liners in all new engines that you buy

Write today for full and detailed information on how PORUS-KROME *will make engines more reliable and will thereby reduce maintenance and operating costs for the user.*

PORUS-KROME

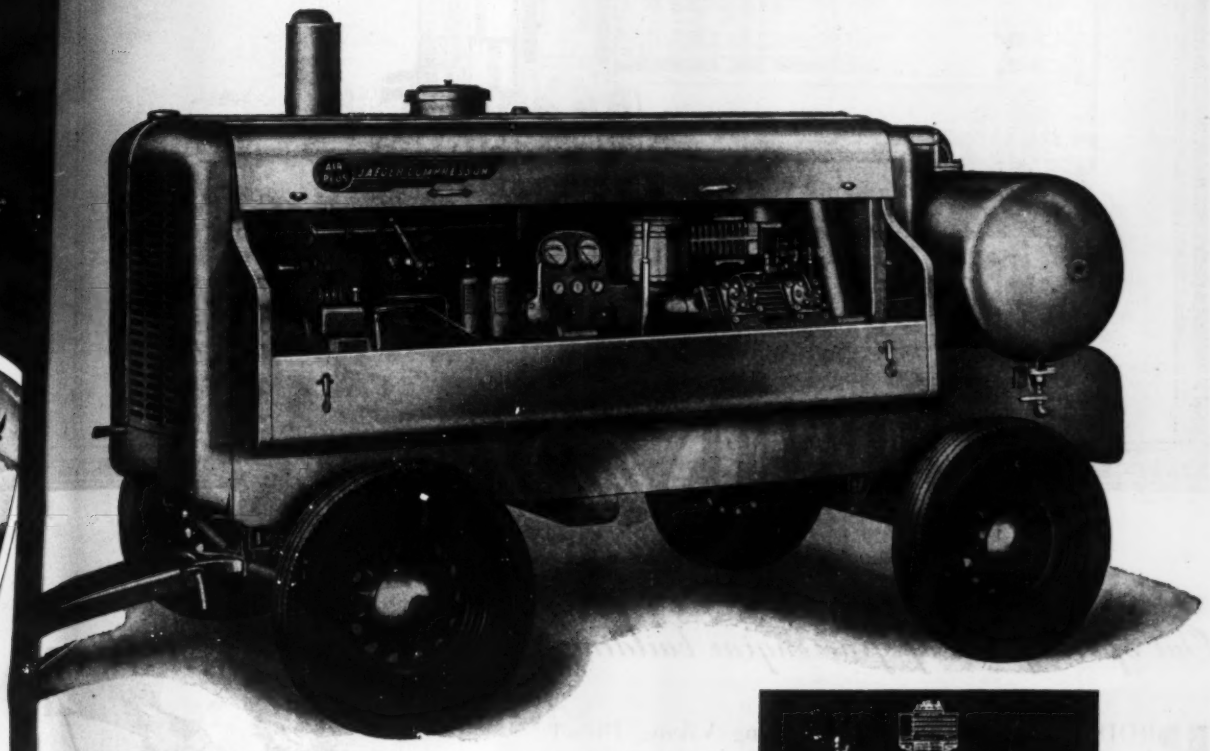
Good for the Life of your Engines

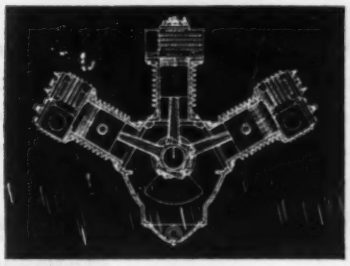
VAN DER HORST

VAN DER HORST CORPORATION OF AMERICA OLEAN • NEW YORK CLEVELAND 11 • OHIO

AN AFFILIATE OF DRESSER INDUSTRIES

AIR PLUS JAEGER COMPRESSOR





BUILT IN A BALANCED "W" TO GIVE YOU S-M-O-O-T-H-E-R PERFORMANCE — COMPLETE ACCESSIBILITY OF EVERY PART

By fundamentally correct design, as well as micro-precision workmanship (parts honed and lapped to aircraft engine tolerances), Jaeger provides the efficiency, stamina and ease of maintenance you have always wanted in air compressors. Identified by the name "AIR PLUS". All sizes, from 60 to 500 feet. . . . THE JAEGER MACHINE COMPANY, COLUMBUS 16, OHIO.

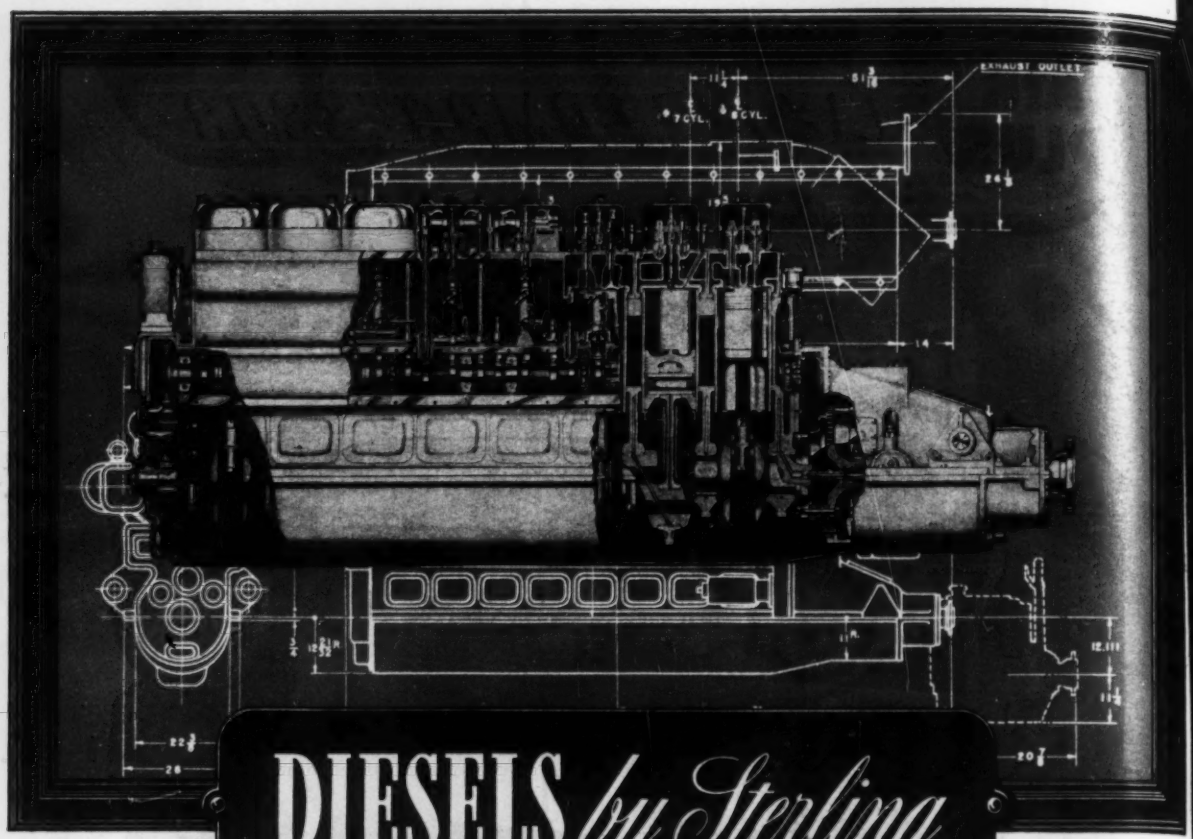
"FLEET-FOOT" Crane-Loaders

"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMAS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS



DIESELS *by Sterling*

Out of 40 years of fine engine building

PRODUCTION of the new Sterling Viking Diesel engine is so geared now that almost immediate deliveries are available. Write us for full details of this new power plant for marine or industrial use which gives you the compactness of a gasoline engine of the same power rating plus the economy of diesel fuel. Other Sterling engines—six or eight cylinders—gasoline or gas from 85 hp. to 1800 hp.

ORDERS ACCEPTED NOW FOR EARLY DELIVERIES

"KEEP BUYING WAR BONDS"

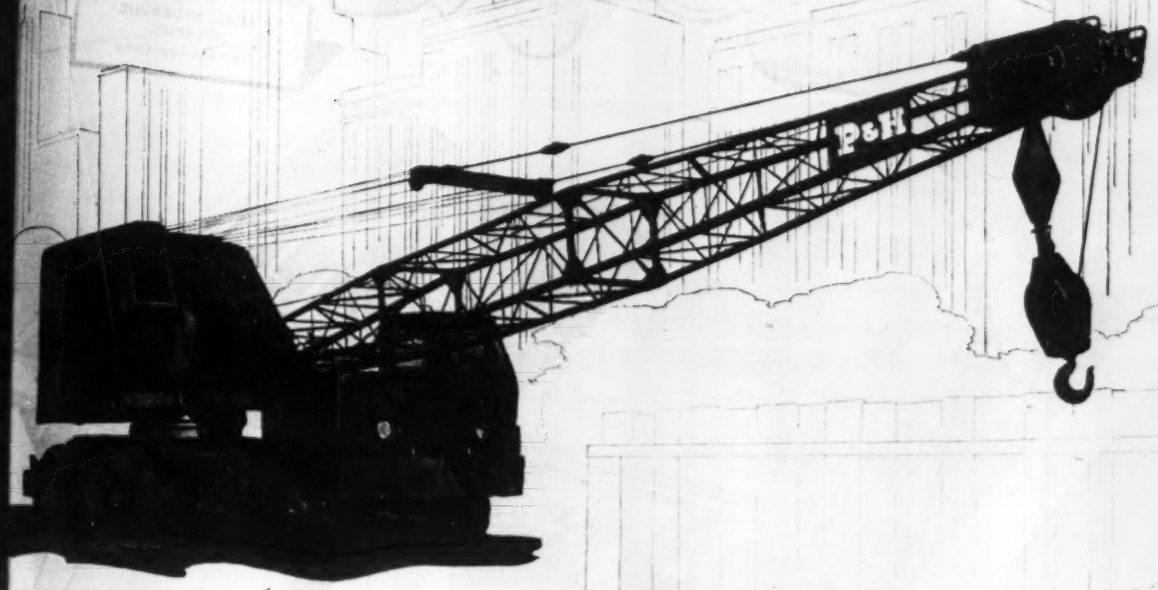
STERLING

VIKING DIESEL

STERLING ENGINE COMPANY 1275 Niagara St., Buffalo 13, N. Y.

New York City, 900 Chrysler Bldg. • Washington, D. C., 806 Evans Bldg. • Chicago, Illinois, 855 Board of Trade Bldg.

P&H truck cranes



EAST SIDE, WEST SIDE,

ALL AROUND THE TOWN!

The ability of the new P&H Truck Crane to get around town—or all over the county—enables you to get many jobs done before other equipment can get there. And the ability to perform a wide variety of tasks in handling materials, loading or unloading, erecting structural steels, placing concrete, etc., means you can keep them busy more days of the year—working with hook, clamshell, magnet, or dragline bucket.

P&H TRUCK CRANES OFFER YOU

- New improved design.
- Low center of gravity with maximum stability to handle a wider range of work.
- Weave-proof box-section frame—no boom point sway.
- P&H hydraulic control with planetary lowering mechanism for greater placing or handling ease and accuracy.

P&H Truck Cranes are speeding many vital war-time projects, saving time, manpower, and money. Ask for information.

General Offices:

4404 W. National Ave., Milwaukee 14, Wisconsin

P&H

Overhead Cranes • Electric Hoists
Excavators • Welding Positioners
Arc Welders • Welding Electrodes

HARNISCHFEGER CORPORATION

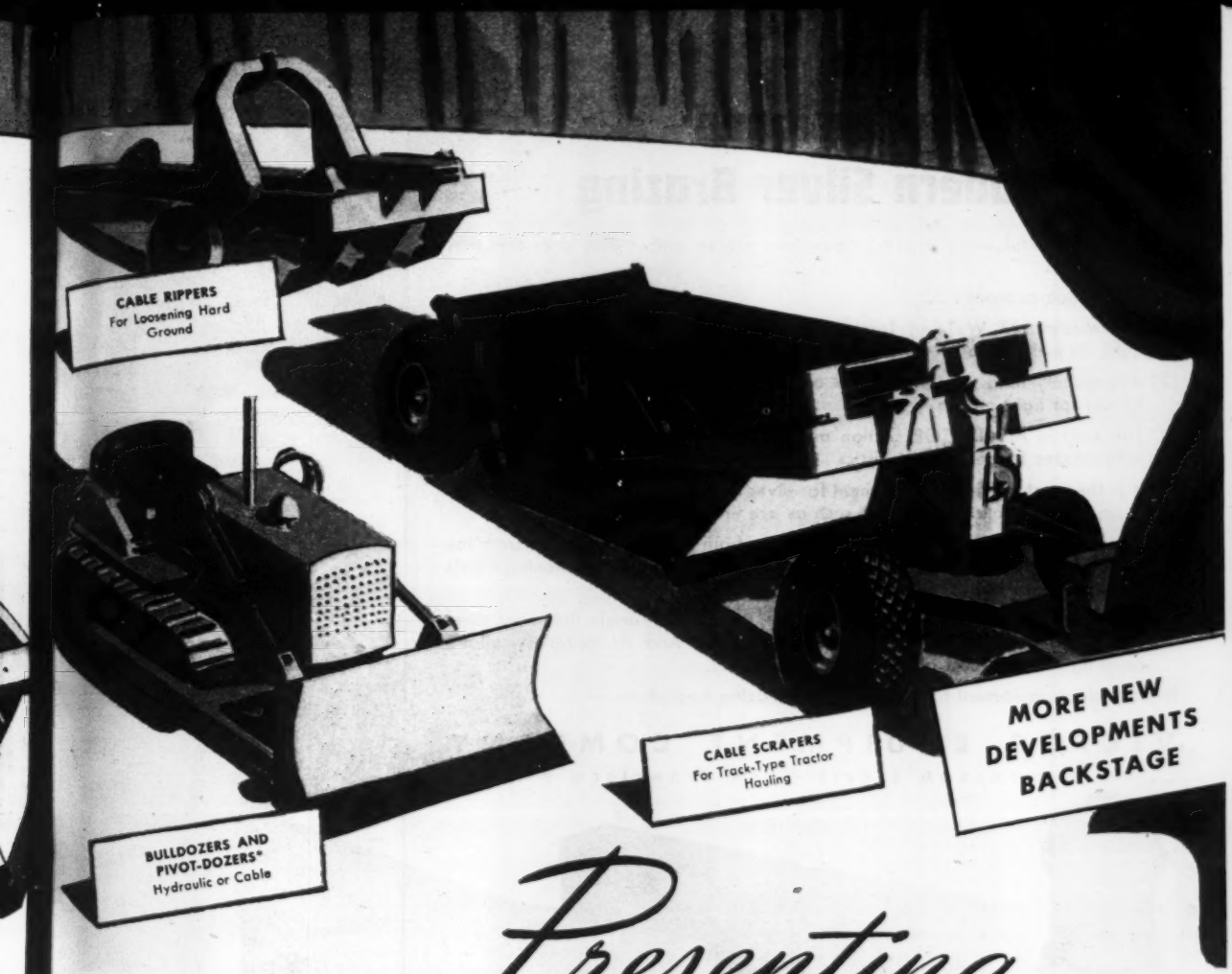
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

A REVIEW OF CURRENT

Proven Product Performance . . . World-Wide User Acceptance . . . 33 Years of Engineering, Manufacturing and Servicing "Know-How"

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment



Presenting

...APLANT-CHOATE MODELS . . .

...r the Benefit of Essential Civilian Users Who Are Interested in Knowing What Equipment Will Be Available in 1945

...pite the heavy *military* demand for LaPlant-...ate equipment, there is a possibility that increas-... quantities of certain models will be available ...t year to *civilian* users with WPB approval. There-..., in order to give you as much assistance as pos-...e in planning your 1945 equipment needs, we ... presenting a review of current LaPlant-Choate ...dels scheduled for production early in '45.

...aturally space won't permit showing you "the ...plete cast" here because LaPlant-Choate is building over 30 different models of earthmoving and land clearing equipment—both cable and hydraulic operated—for use with all sizes of "*Caterpillar*" track-type and high-speed, rubber-tired tractors. However, your *LaPlant-Choate* "*Caterpillar*" distributor, who has been selling and servicing dependable LaPlant-Choate equipment for over 20 years, will gladly give you full information. See him today! LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

*TRADEMARK APPLIED FOR

ARMY E NAVY

Here's a Torch Specifically Designed for Modern Silver Brazing

No wonder skillful silver brazing operators are so enthusiastic over this new VICTOR torch.

Here are their reasons . . .

(1) The Model J27 Welding Torch has ample gas capacity, but its weight is light, its balance perfect.

(2) Adequately long flexible nozzles can be provided with single or multiple flames for light or heavy silver brazing operations.

(3) The built-in AIRADIATOR section assures a cool handle without interfering with proper flame characteristics.

(4) It is the most perfect arrangement for silver brazing of Walworth type of fittings, flanges, collars, and "L's" such as are encountered in marine work.

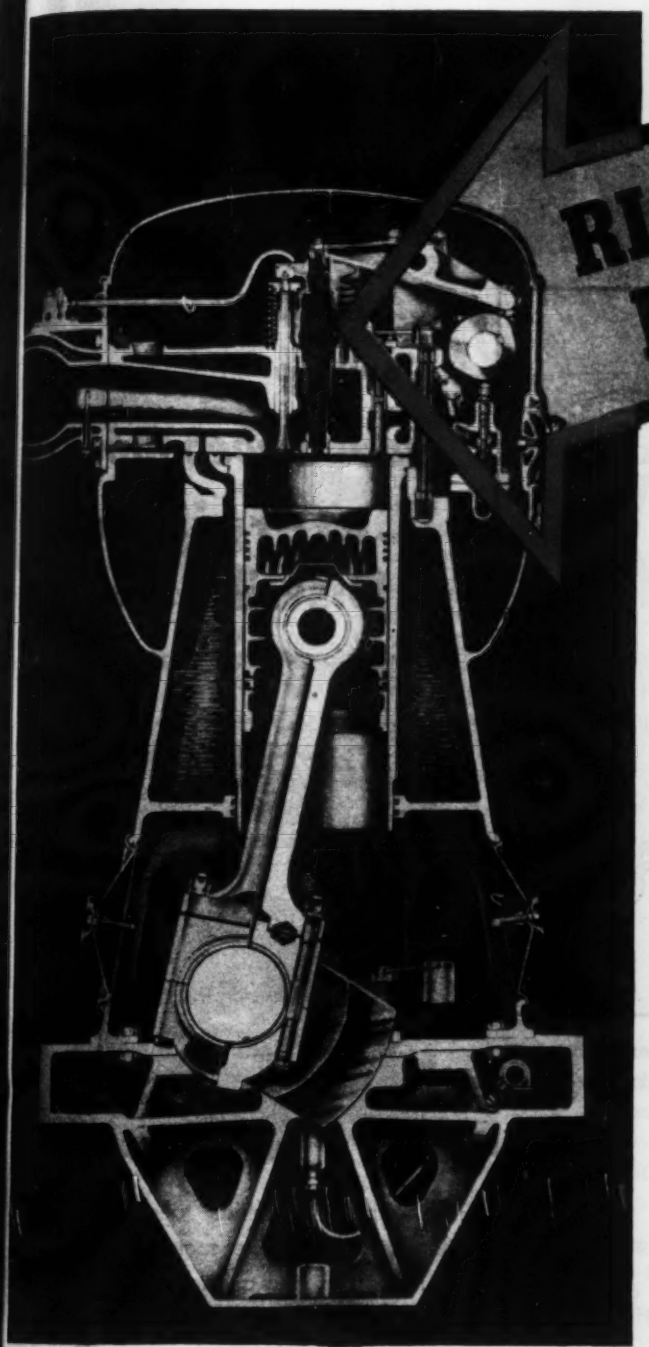
(5) It can be held conveniently and sturdily by both hands, far enough from the work yet kept in constant and controlled motion. The valve positioning clears the operator's hands, makes for accessibility.

(6) It produces just the right kind of feathery, soft flame—single flame for some operations, multiple flame for heavier sections. And its flexibility allows bending into the most advantageous shapes.

It is the ideal equipment for modern silver brazing operations.

VICTOR EQUIPMENT COMPANY

Ad 88 844 FOLSOM STREET · SAN FRANCISCO 7



RIGHT WHERE IT BELONGS!

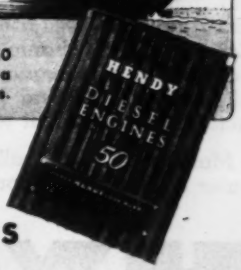
The unit-type fuel injector in Hendy Diesel Engines is right in the head...*logically* placed for satisfactory service under all load conditions, with *uniform* high-pressure fuel charge to *each* cylinder. This injection system provides individual fuel pumps for each cylinder...does away with long, high-pressure fuel lines... simplifies service because the entire unit can be easily removed for cleaning.

In addition to the unit-type fuel injector you'll find other important features too, such as...overhead camshaft, direct actuated dual intake and exhaust valves, and hydraulic tappets. All these features, *combined for the first time in a single engine,* reduce the number of wear points, simplify service and contribute directly to the lower maintenance costs a successful Diesel operator must have.

In marine service—or for stationary duty—Hendy Diesels can serve you well. They combine two great qualities...all the ruggedness for rough seas; all the good features for low-cost operation.

Hendy Diesels for marine or industrial service... 6 or 8 cylinders, 350 to 675 hp... are also available with Hendy generators as complete electric generating plants.

Hendy is currently supplying 250 kw Diesel generating sets for a large number of AVI cargo ships.



Write today for complete data—ask for the New Hendy Series 50 Diesel Engine Catalog.

JOSHUA HENDY IRON WORKS

ESTABLISHED 1856

SUNNYVALE, CALIFORNIA

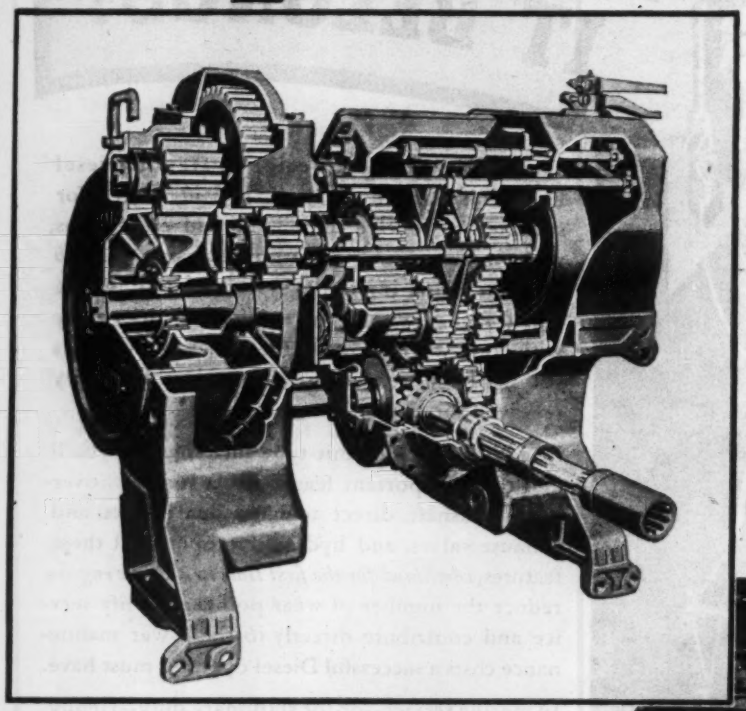
Manufacturing Plants: SUNNYVALE, POMONA and TORRANCE in CALIFORNIA • AMPERE, NEW JERSEY • ST. LOUIS, MISSOURI

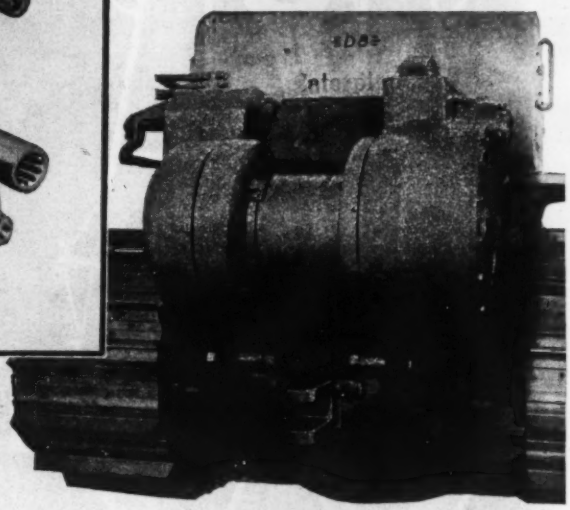
51-D-9

Branch Offices: BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • SAN FRANCISCO • ST. LOUIS • WASHINGTON

Experts

on Tractor and Equipment Repair Service ..... Your Dependable "Caterpillar" Distributor





Proper upkeep of your tractor and its equipment is vitally important today. It's smart economy. It's also wise to go to your "Caterpillar" distributor. His factory trained mechanics do expert repair work, save unnecessary expense, and will get your equipment back on the job that much sooner.

Every "Caterpillar" dealer and serviceman is a HYSTER Winch specialist. These rugged winches work long and hard with minimum time out for repairs. But, like any good machine, adjustments are sometimes necessary. Have your "Caterpillar" mechanic check your HYSTER Winch. Then you'll be all set for winter weather towing jobs; with lots of pull for heavy towing in muddy going; with insurance that tractor and equipment won't stay bogged down.

Make that "one call" trip now. See your "Caterpillar" dealer and be ready for a full season's work.

Service by "Caterpillar" dealers, everywhere, is a valuable factor to keep in mind when buying a tractor winch. With a HYSTER Winch on your "Caterpillar" tractor, you'll get expert, "one-stop" service—all at the same place. Write for HYSTER Winch catalog.

HYSTER

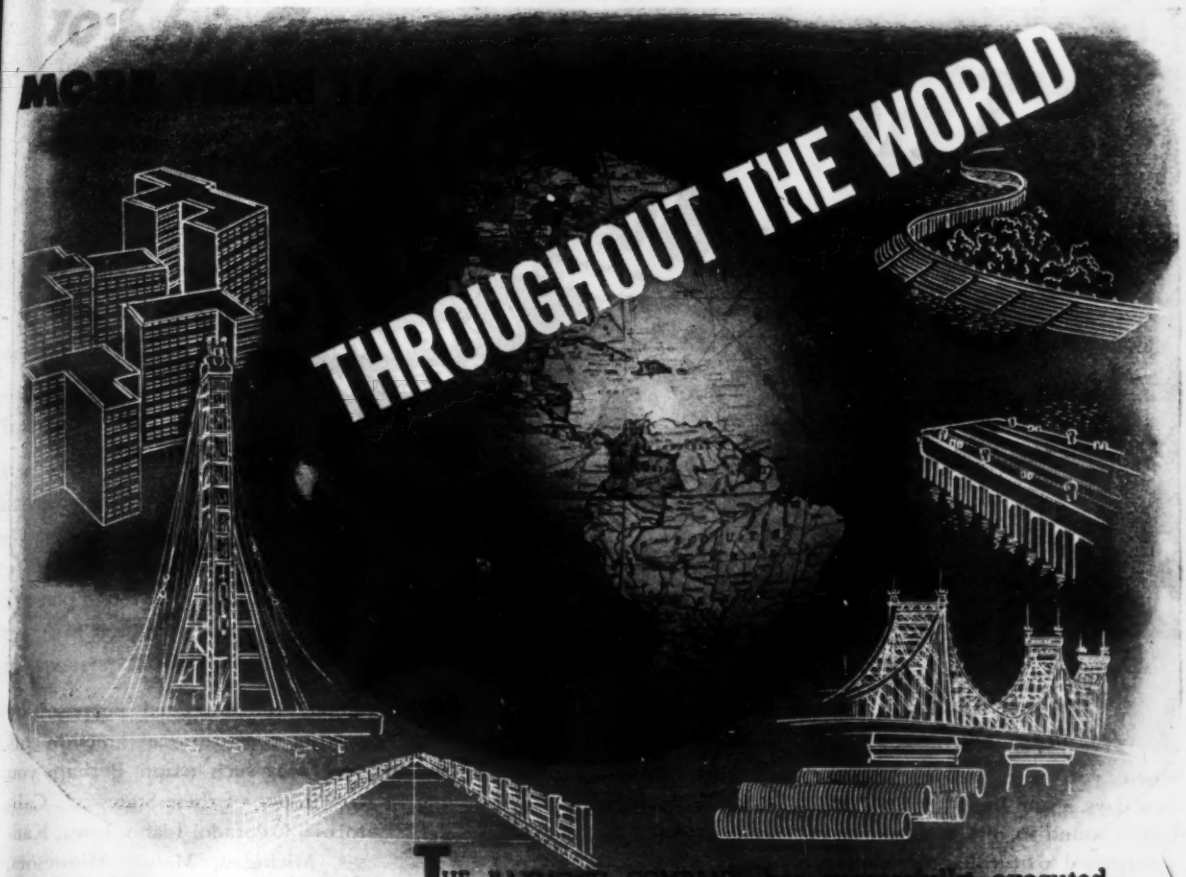
HYSTER Company

2953 N. E. Clackamas, Portland 8, Oregon

1853 N. Adams, Peoria 1, Illinois

LARGEST MANUFACTURER OF TRACTOR HOISTS AND WINCHES

Sold and Serviced by "Caterpillar" dealers everywhere.



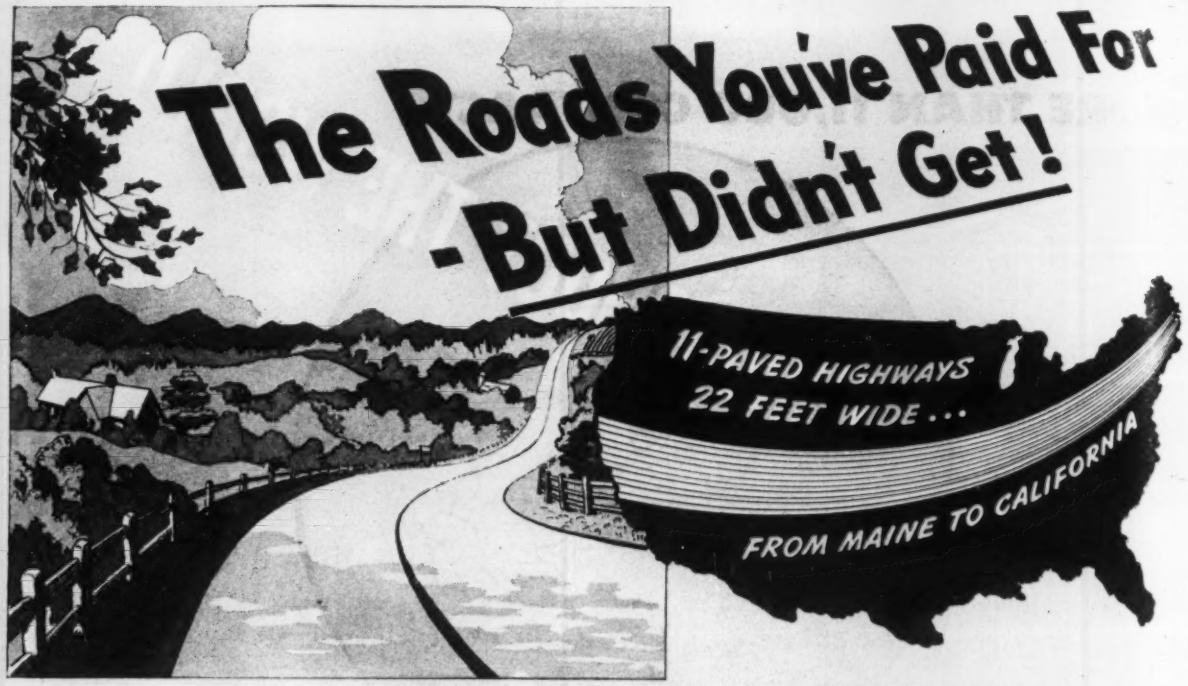
THE RAYMOND COMPANY has successfully executed more than 11,000 contracts greatly diversified in character, location and size—and domestic activities have long been supplemented by continuous operations in South America and other foreign fields.

This world-wide responsibility on jetties, foundations, harbor and river improvements, tunnels, dams, highways, community development, housing and industrial projects has resulted in the development of a specially trained personnel—skilfully experienced in all the various phases of working conditions in different countries and possessing a comprehensive knowledge of languages and customs. We invite your inquiries whether the job is large or small—for today or tomorrow.

SCOPE OF RAYMOND'S ACTIVITIES

Includes every recognized type of pile foundation—concrete, composite, precast, steel, pipe and wood. Also caissons, construction involving shore protection, ship building facilities, harbor and river improvements, borings for soil investigation.

RAYMOND



TAXES USED *for Other Purposes*

When you start talking figures these days, a sum like $1,555,002,000 doesn't sound so big. But, you may be surprised to hear that this amount would pave eleven 22-foot concrete highways from Maine to California!

This 1½ billion dollars is the total of your **highway tax money** which was allocated by State agencies for purposes **other than road building and upkeep** from 1934 through 1942.

Just think of the new highways which **could have been built . . .** the narrow pavements which **could have been widened . . .** the grade separations and other safety improvements which **could have been paid for with this sum!**

FUNDS *Raided*

But, instead, these billion and a half dollars have been allocated to financing unemployment . . . relief costs . . . and other miscellaneous purposes which are entirely foreign to highway construction and maintenance.

No one will argue, perhaps, that some of the projects this money supported were not worthy, but the fact remains that **the taxes you pay for the use of the highways should be expended solely for highways!**

ARE YOUR HIGHWAY TAXES *Too High?*

Since you and all other highway users have paid more than a billion and a half dollars for roads you didn't get, doesn't it seem logical to assume that either — **(1) the taxes on all motor vehicles are too high, or (2) highway building, maintenance and safety programs are being sacrificed?**

15 STATES *Protect* THE TAXPAYERS

To date, 15 States have put a stop to this dipping into highway tax money for unrelated purposes by passing constitutional amendments outlawing such action. Perhaps you live in one of these States . . . California, Colorado, Idaho, Iowa, Kansas, Michigan, Maine, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, South Dakota or West Virginia. Kentucky, Nebraska and Washington are expected to join this group.

HOW TO GET THE HIGHWAYS *You Pay For!*

However, if you live in any of the other 30 States (except Louisiana, Kentucky and Iowa) your State Legislature will meet in regular session early in 1945. This, then, is the time to insist that your Legislators take action to safeguard *your* highway tax money. Such action will guarantee either — (1) **better and safer highways, or (2) a reduction in your highway taxes.**

World's Largest Builders of Truck-Trailers *Service in Principal Cities*

FRUEHAUF TRAILER COMPANY • DETROIT 32

[This message is appearing in a number of National Publications in the public interest and as a service to the Motor Transport Industry]

It Will Pay You to Make the Nearest
LeTOURNEAU DISTRIBUTOR
your EARTHMOVING HEADQUARTERS

He Specializes in Fast, Rubber-Tired Power ... Is Equipped and Trained to Provide Quick, Expert Service ... Can Help You on Priorities

Your LeTourneau distributor was selected for his knowledge of construction equipment and his ability to render complete parts and repair service to LeTourneau users. Both his sales and service staffs have taken refresher courses to bring to you the latest and best war-tested practices of repair and equipment application.

When you need parts and repair service or new equipment, call your nearest LeTourneau distributor. He's listed below—he can help you get machinery for essential jobs NOW.

For faster, lower-cost earthmoving, use the rubber-tired power of Tournapulls.

ALABAMA
Construction Equipment Co., Birmingham, Montgomery.
CALIFORNIA
Crook Company, Los Angeles.
Soulé Equipment Company, Oakland, Sacramento, Fresno.
COLORADO
The Colorado Builders' Supply Co., Denver.
CONNECTICUT
The Nicoll-Talcott Co., Hartford.
FLORIDA
Florida Equipment Company, Jacksonville.
Florida Equipment Company, Miami.
Florida Equipment Company, Tampa.
GEORGIA
Gill Equipment Co., Atlanta.
IDAHO
The Sawtooth Company, Boise, Twin Falls.
ILLINOIS
Chicago Construction Equipment Co., Chicago, Peoria.
INDIANA
Indiana Equipment Co., Inc., Indianapolis.
IOWA
James W. Bell Co., Cedar Rapids, Des Moines.
LOUISIANA
Universal Tractor & Equipment Co., Baton Rouge, Shreveport.
MARYLAND
General Supply & Equipment Co. Inc., Baltimore.
MASSACHUSETTS
Parker-Danner Company, Hyde Park.
MICHIGAN
Cyril J. Burke, Detroit.
Contractors Machinery Co., Grand Rapids.
Straits Engineering Company, Sault Ste. Marie.

MINNESOTA
Phillippi-Murphy Equipment Co., Minneapolis.
MISSOURI
The Victor L. Phillips Co., Kansas City.
Rozier-Ryan Company, St. Louis.
MONTANA
Montana Powder & Equipment Co., Helena.
NEBRASKA
Hasselbalch-Rinck Co., Omaha.
NEVADA
Sierra Machinery Co., Reno.
NEW YORK
Rupp Equipment Co., Buffalo.
NEW HAMPSHIRE
Parker-Danner Company, Manchester.
NEW MEXICO
Contractors Equipment & Supply Co., Albuquerque.
NORTH DAKOTA
Smith Commercial Body Works, Inc., Fargo.
OHIO
Gibson-Stewart Co., Cleveland.
OKLAHOMA
Wylie-Stewart Company, Oklahoma City.
OREGON
Loggers & Contractors Machinery Co., Portland, Eugene and Klamath Falls.
PENNSYLVANIA
Furnival-Rimmer Co., Philadelphia.
Dravo-Doyle Company, N.S. Pittsburgh.
RHODE ISLAND
Parker-Danner Company, Providence.
SOUTH CAROLINA
Concrete and Construction Supply Co., Columbia.

TENNESSEE
Dempster Bros., Inc., Knoxville.
Tri-State Equipment Co. Inc., Memphis.
TEXAS
Conley-Lott-Nichols Machinery Co., Dallas.
Contractors Equipment & Supply Co., El Paso.
J. E. Ingram Equipment Co., San Antonio.
UTAH
Landes Engineering Co., Salt Lake City.
VIRGINIA
Phillips Machinery Co., Richmond.
WASHINGTON
Pacific Hoist & Derrick Co., Seattle.
Modern Machinery Co., Inc., Spokane.
WISCONSIN
Hunter Tractor & Machinery Co., Milwaukee.

CANADA

ALBERTA
Costello Equipment Co., Ltd., Calgary, Edmonton.
BRITISH COLUMBIA
Vancouver Equipment Corp., Ltd., Vancouver.
MANITOBA
Mumford, Medland, Ltd., Winnipeg.
NEW BRUNSWICK
Eastern Equipment, Limited, Fredericton.
NOVA SCOTIA
Foulis Engineering Sales, Ltd., Halifax.
ONTARIO
The General Supply Co. of Canada, Ltd., Ottawa, Toronto.
QUEBEC
The General Supply Co. of Canada, Ltd. (branch), Montreal.
SASKATCHEWAN
J. R. Paisley, Ltd., Regina.

For expert repair and genuine parts, be sure to contact your official LeTourneau distributor — he's listed above.

LETOURNEAU TOURNAPULLS

PEORIA, ILLINOIS STOCKTON, CALIFORNIA

***Manufacturers of* TOURNAPULLS*, ANGLEDOZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNATRAILERS*, TOURNACRANES*, TOURNATRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNAWELD*, TOURNALIFTS*.**

*Trade Mark Reg. U. S. Pat. Off.

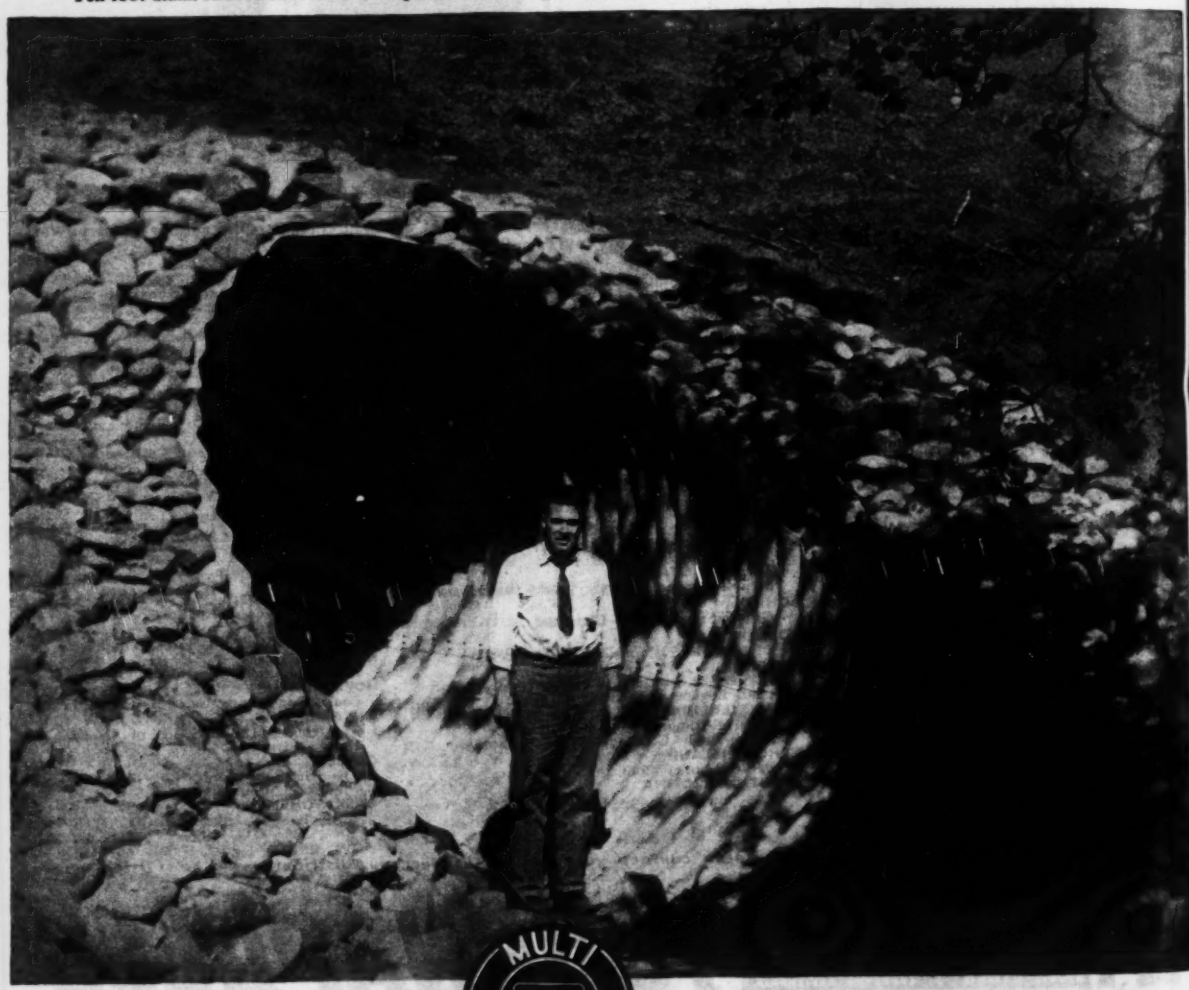
Meet the Alaska's "GRAND-DAD" Of Corrugated Culverts

Replacing a timber bridge on the old trail from the Peace River to Fort St. John, British Columbia, is this 10-foot diameter ARMCO MULTI PLATE Pipe under 26-feet of cover.

The large flexible culvert is the "grand-dad" of thousands of nestable-type metal culverts under the Alaska Highway between Dawson Creek, B. C., and Fairbanks, Alaska. Most of these replaced log culverts under the "tote" road of 1942.

The engineers wisely adopted these sturdy metal pipes to meet the extreme service conditions—ice, fire for thawing, mushy foundation soils, and difficult transportation problems. You too will find ARMCO standard corrugated and MULTI PLATE culverts a wise investment for your post-war road construction. For further information write to: Armco Drainage Products Association, Middletown, Ohio.

Ten-foot diam. ARMCO MULTI PLATE Pipe on Alaska Highway north of Peace River.

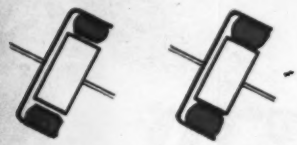


ARMCO MULTI PLATE

Proved for You

by an unequaled NAVY RECORD

The Fawick Airflex CLUTCH CONTROLS POWER BY AIR



Here is the way it works
Let air under pressure into the rubber-and-fabric gland, and the clutch engages. Let the air out and it disengages. You can have as light, or as firm, a grip as the job requires.

Under battle conditions, Navy vessels equipped with the Fawick Airflex Clutch have greater maneuverability, and more reliable performance, than naval engineers ever thought possible.

This is proved by the records of thousands of Diesel-powered ships of various types.

Power controlled by air! Power controlled without springs, arms or levers, requires no lubrication, needs no adjustments!

The same clutch has been engineered for industrial use in heavy-duty service—with performance records matching those made on the sea.

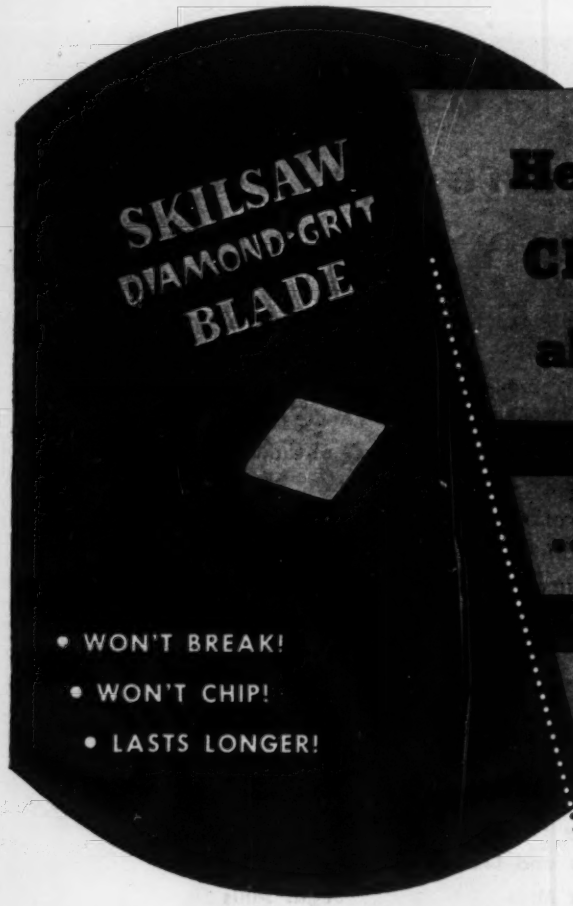
The Fawick Airflex Clutch is used with remarkable success on:

Diesel Drives	**Rubber Mills**
Heavy Presses	**Mine Hoists**
Drags and Cranes	**Oil Field Drives**
Paper Mills	**Sugar Mills**
Steel Mills	**Power Shovels**

Our Engineering Department will gladly give you complete data, and recommendations based on experience.

FAWICK AIRFLEX COMPANY, INC.
9919 Clinton Rd. · Cleveland 11, Ohio
***In Canada,* Renold-Coventry Ltd., Montreal, Toronto, Vancouver**
***In Britain,* Crofts Engineers, Ltd., Bradford, England**

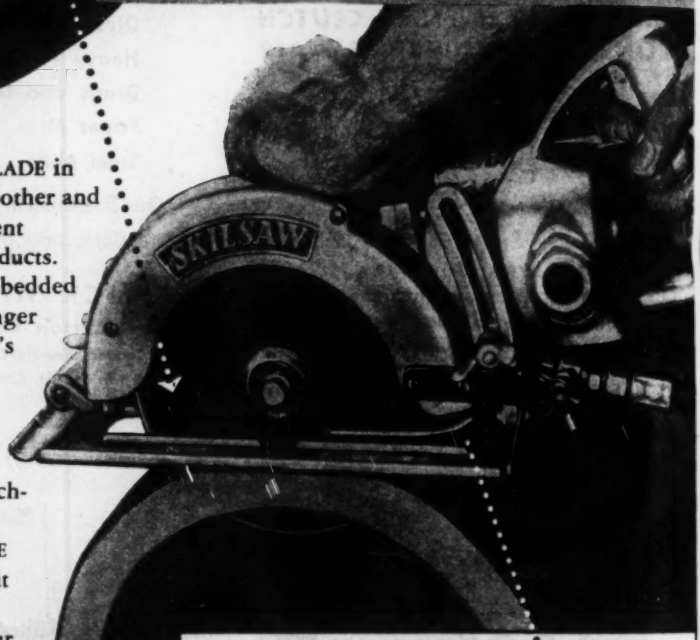
FAWICK *Airflex* CLUTCH
POWER CONTROLLED BY AIR



Here's the FASTEST, CLEANEST way to cut all masonry products...

...use this METAL BLADE in your SKILSAW!

- WON'T BREAK!
- WON'T CHIP!
- LASTS LONGER!



● Put a SKILSAW DIAMOND-GRIT BLADE in your SKILSAW and see how much faster, smoother and cleaner you can cut glass, tile, asbestos cement and a host of other hard-to-cut masonry products.

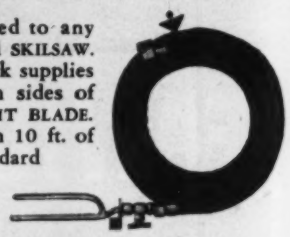
This metal blade has a hard edge embedded with *diamond grit* for keener cutting and longer life. It outlasts abrasive discs 5 to 1 . . . so it's *more economical.* It won't break, chip or throw off fragments . . . so it's *safer.* It *saves time* by eliminating the need of frequent adjustments of the saw base. And it's *dustless* . . . a simple, efficient water feed attachment supplies water to both sides of the cut.

The SKILSAW DIAMOND-GRIT BLADE is available in 3 thicknesses and in sizes to fit all current model SKILSAWS. Ask your distributor today for a demonstration on your own work.

SKILSAW, INC.
5033-43 Elston Avenue, Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

SKILSAW Water Feed Attachment

Easily attached to any current model SKILSAW. Perforated fork supplies water to both sides of DIAMOND-GRIT BLADE. Equipped with 10 ft. of hose with standard connection.



SKILSAW PORTABLE ELECTRIC TOOLS
MAKE AMERICA'S HANDS MORE PRODUCTIVE

THE WORLD'S LARGEST PIECE OF HOSE

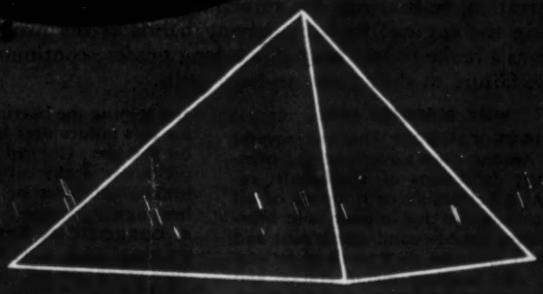
24" I.D. 50 FT. LONG WT. 5 TONS

More than 30,000,000 cubic yards of Mississippi River bottom have already passed through this hose.

This amount of material would make 10 pyramids, each as large as the Great Pyramid of Egypt.

It would fill a trench two yards wide and two yards deep that would reach from Boston to Los Angeles.

This piece of hose was installed in 1940 as a flexible joint on the suction end of a hydraulic dredge. It is still in use and GOING STRONG!



DIMENSIONS OF GREAT PYRAMID

Base: 750 ft. x 750 ft.
Height: 482 ft.
Contents: 3,041,148 Cu. Yds.

BOSTON WOVEN HOSE & RUBBER COMPANY

WORKS: CAMBRIDGE, MASS., U.S.A. P.O. BOX 1071, BOSTON 3, MASS., U.S.A.

SUCH THINGS as load, speed and temperature have a very material effect on the life of automotive bearings. Sometimes bearing failures are caused by dirty lubricating oil. When the oil is contaminated with water, fuel, sand, dirt, carbon particles or finely divided metal, excessive wear in the bearings results. Present day driving conditions which tend to create low temperature sludge, clog oil lines and screens and result in burned out bearings.

A great many bearings are ruined by overloading (lugging) and overspeeding the engine; by such driving habits as the prolonged use of the engine as a brake in low gear, down long grades; continuous driving at top speeds; failure to shift gears on hard pulls.

WHY BEARINGS FAIL

1. FATIGUE FAILURE: Due to several causes. Among them: overloading; overspeeding; deflections of crankshaft; insufficient oil clearance or stoppage of oil supply; distortion due to poor fit of bearing inserts; out-of-round crank pins and crankshaft journals. As a result of fatigue failure, the bearing metal cracks and flakes out, the rod portion of the bearing failing first, then the bearing cap.

2. WEAR FROM DIRT: The result of infrequent draining and flushing of the crankcase or infrequent servicing of the air and oil bath cleaners.

3. WIPING: Friction heat often causes the bearing metal to melt and run, or to become soft and plastic. This in turn allows the bearing metal to wipe or smear against the harder metal surfaces of the crank pin or bearing journal, cracking and wiping the bearing metal. The causes for this failure are: lack of oil; plugged oil passages; clogged pump screen; worn oil pump; leaky oil pump suction line; broken oil lines or connections; misfit bearings.

4. CORROSION: Prolonged high speed driving and overloading will produce crankcase oil and bearing temperatures above 250° F. in most late model engines. At such temperatures most lubricating oils are subject to oxidation and consequent production of organic acids that are corrosive to bearing metals. The remedy is to use lubricating oils that won't readily form corrosive acids and to drain and flush crankcases frequently.

WATCH DRIVING AND SERVICING

To avoid bearing trouble, don't overload; don't brake with the engine for prolonged periods of time; don't use all your horsepower any more than you have to. Have your engine serviced at more frequent and regular intervals. Use only the best lubricating oil obtainable.

RING-FREE MOTOR OIL HELPS PREVENT BEARING FAILURES

Macmillan Ring-Free Motor Oil has the properties that guard against bearing failure. It has high film strength; high heat resistance; a long cling to the vital parts of your engine; fast penetration. It has a cleansing action that washes away carbon particles, carrying them into the crankcase where these impurities are drained at time of oil change.

FREE FOLDER *on "Bearing Failures—Causes and Corrections"*—Send today for your copy. Address Macmillan Petroleum Corporation, Room 1001, 530 West Sixth Street, Los Angeles 14, California

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION—50 WEST 50TH STREET, NEW YORK • 624 SOUTH MICHIGAN AVENUE, CHICAGO 5 • 530 WEST SIXTH STREET, LOS ANGELES 14 • COPYRIGHT 1944, MACMILLAN PETROLEUM CORPORATION

OFFICIAL U. S. NAVY PHOTOGRAPH

Flaps down! Hook down! TIGER BRAND landing ropes up!

"It's no easy job landing on a carrier. It may be an 'airfield that floats' but it isn't the best landing strip in the world. You have only a very short distance in which to land, and stop. Long swells make the deck roll. You make a wide turn around the stern and head in. The landing officer draws a hand across his throat. Cut! You close the throttle and slap her down. The hook catches a landing rope, your wheels strike, and you are pulled to a stop. You're down!"

• • •

INDISPENSABLE part of the ingenious arresting gear that gentles a landing plane to a safe stop on a U.S. carrier's flight deck, American TIGER BRAND Wire Rope does its part in carrying our Navy's aerial punch to every far-flung corner of the seven seas.

Made of high-strength steel, the special TIGER BRAND Arresting Gear Rope (Excellay Preformed) was selected for the major share of these installations because it ideally combines the strength, stamina and flexibility vital for safety in this highly hazardous duty.

This application of TIGER BRAND is typical of many wartime uses in which our research and manufacturing departments have collaborated to produce wire rope to meet severe and unusual requirements. It is on the basis of such accomplishment that we can promise you in TIGER BRAND a better product than ever before, when wire rope again becomes fully available for civilian service.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

Excellay Preformed

UNITED STATES STEEL

2,500,000

This job

POWER-FEED ADVANTAGES

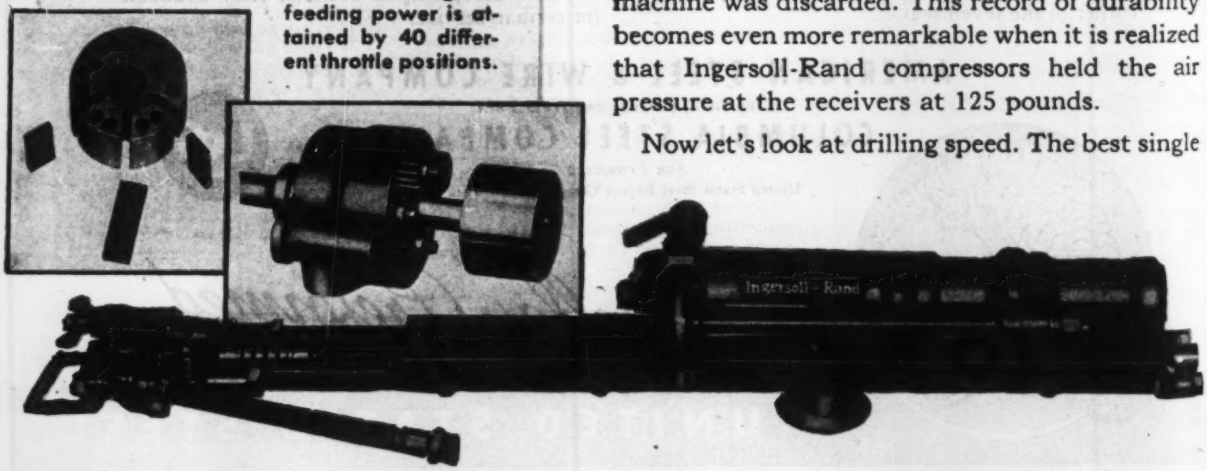
1. The Power-Feed reduces drilling time.

2. A sturdy, trouble-free motor and gearing arrangement insures a dependable feeding action.

3. The Power-Feed attached to the back end of the shell, provides safety and freedom from shock.

4. One size of Power-Feed is used for all I-R Drifters. This simplifies the stocking of repair parts.

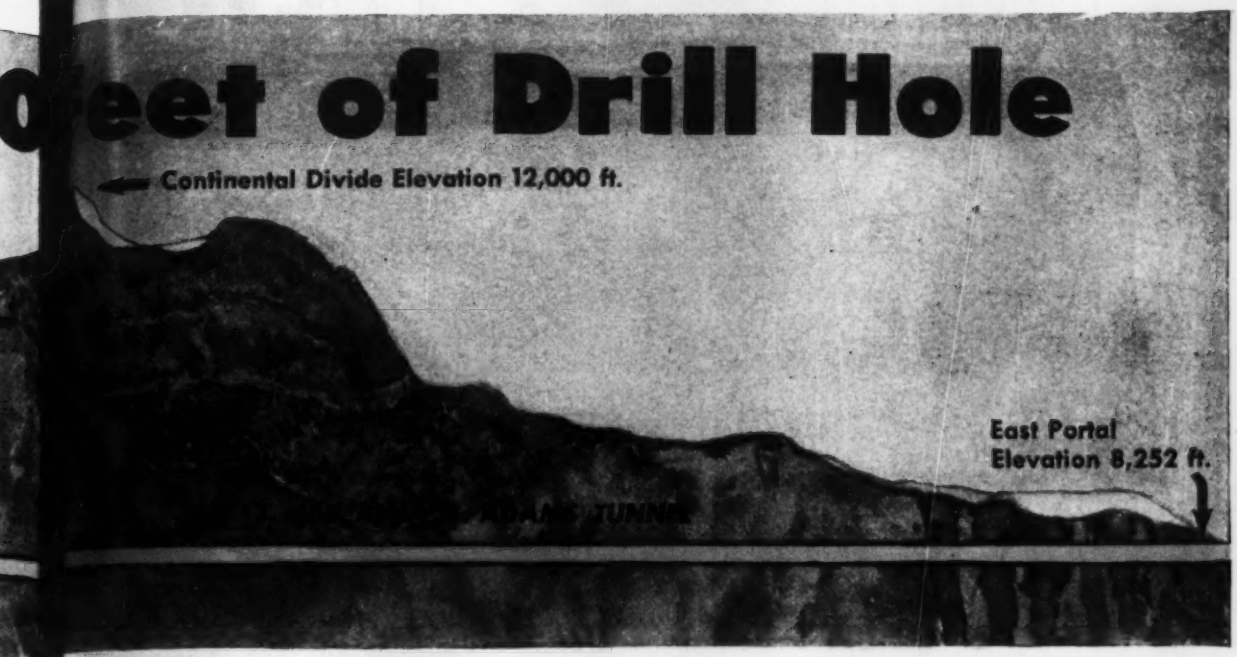
5. A wide range of feeding power is attained by 40 different throttle positions.



With the completion of the 13-mile Alva B. Adams Tunnel, originally called the Continental Divide Tunnel, a new high in overall rock drilling performance has been written into the records.

DA-35 Power-Feed Drifters (3½-inch bore) drove all but the first 6600 feet of this tunnel. They put down approximately 2,500,000 feet of drill hole. Some of these drifters had already seen service in the 6300-foot Treasury Tunnel. Despite this fact, when operations were finished, all the original drills were still in service. Not a single machine was discarded. This record of durability becomes even more remarkable when it is realized that Ingersoll-Rand compressors held the air pressure at the receivers at 125 pounds.

Now let's look at drilling speed. The best single



proves DA-35 Durability and Drilling Speed

day's advance in one heading in this 11¾-foot bore was 74 feet. The best monthly record was 1624 feet. Drilling speed such as this enabled the crews to complete this 13-mile tunnel in three years of actual working time. The performance was so noteworthy that it caused one official to state that only a few years ago the driving of this tunnel would have been a ten-years' job.

The steady flow of repeat orders for DA-35 Drifters from many mining men, contractors, and quarry operators, is further proof of the outstanding durability and drilling speed designed into these machines.

See for yourself how these machines will improve your operating picture! Ask your nearest Ingersoll-Rand service branch for full particulars.

OTHER I-R PRODUCTS USED ON THIS PROJECT

COMPRESSORS. **Two veteran, belt-driven units furnished 125 pounds pressure 24 hours a day.**

JACKBITS. **Only 2.83 Jackbits were required for each linear foot of tunnel advance. Each bit was used 7 times.**

JACKBIT RECONDITIONING EQUIPMENT. **The I-R line consisting of Jackfurnaces, Sharpeners and Jackmills was used at both East and West portals. Each hotmill averaged 850 bits per day.**

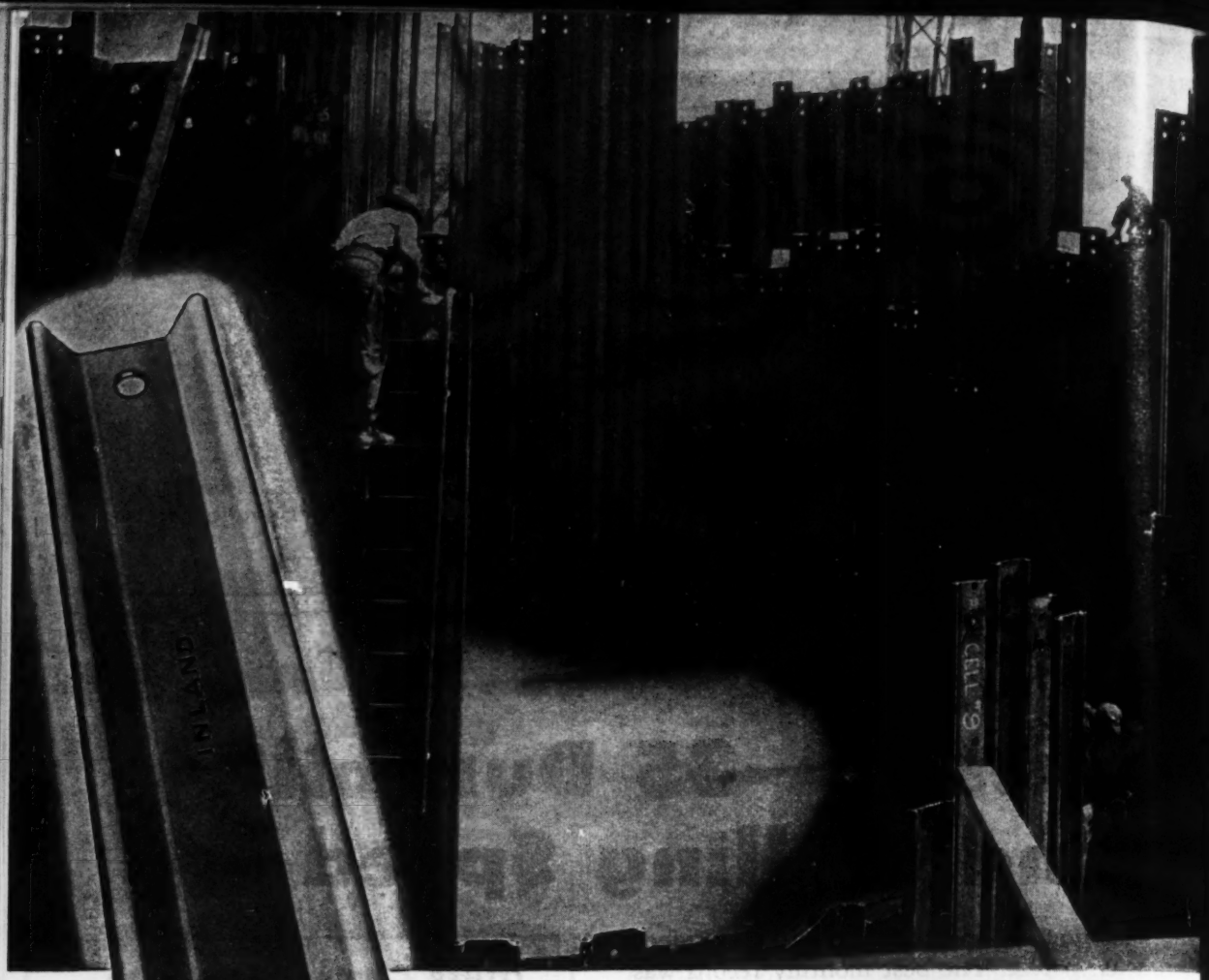
SUMP PUMPS. **These lightweight, portable units delivered the water from the west heading to the main pump station.**

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

OMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

5-545



Inland Steel Piling—Dependable, Economica

In all parts of the country, from coast-to-coast—for locks, dam docks, breakwaters, and numerous other applications—Inland Ste Sheet Piling is giving dependable, economical service.

Made of special analysis steel of unusual hardness, and tensi strength of more than 70,000 lbs. per sq. in., Inland Piling can b driven and pulled many times.

Inland engineers have had broad experience in working wit contractors on piling jobs. They are ready to help you design f economy and fast erection, no matter how difficult the constructio problems may be.

Sheets • Strip • Tin Plate • Bars • Plates • Floor Plate • Structur Piling • Rails • Track Accessories • Reinforcing Bars

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Branch Offices: **Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • S**

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)
10 cents a word, minimum charge $2.00. POSITIONS WANTED (full or part-time individual salaried employment only). ½ the above rates, payable in advance. (See ¶ on box Numbers.)
PROPOSALS, 50 cents a line an insertion.

INFORMATION:
BOX NUMBERS care publication New York, Chicago or San Francisco offices count as 10 words additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
The advertising rate is $7.75 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by January 5th appear in January 11th issue subject to limitations of space available.

CONSTRUCTION SUPERINTENDENT

Preferably graduate engineer for training with national organization making concrete products with exceptional post-war possibilities. Job will lead to management of local plants scattered over the country. Age preferred 30 to 45. Must have pleasing personality, some selling ability and be able to handle men. Some native mechanical ability very desirable. Include Photograph with reply.
Address

P-842, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL STEEL ESTIMATORS WANTED

By large structural steel fabricator. Previous experience desirable but not essential. Draftsmen, structural detailers or those able to read blue prints urged to reply. Southern location. These are not temporary or duration openings.

P-844, Engineering News-Record
330 West 42nd St., New York 18, N. Y.

Are You Seeking or Offering

— business
— equipment
— employment
"OPPORTUNITIES"?

To fill any of these "industry wants" a logical source is found in this Searchlight Section—Classified Advertising.

Experience has shown that the Searchlight Section produces quick results because it spotlights current opportunities of special interest to more than 75,000 readers of "News-Record"—construction men throughout the field of engineered construction.

Use "Searchlight"—at low cost—to feature your wants or offerings . . . whether it concerns employment, buying or selling used or surplus new equipment, or other pertinent business "opportunities."

When Answering Advertisements

Please do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbon copies.

STRUCTURAL DRAFTSMEN

We need two men with at least five years experience on all-steel buildings, sub-stations, towers, etc., for post-war designing.

INTERNATIONAL DERRICK & EQUIPMENT COMPANY
875 Michigan Ave. Columbus, Ohio

POSITIONS VACANT

ARCHITECTURAL DRAFTSMAN experienced in quantity take-offs and architectural rendering. If possible send photostat of sample rendering. We will not be responsible for returning same. This is a real opportunity with a young aggressive firm doing an outstanding job in the construction industry. Thomas Bryan & Associates, P. O. Box 46, Lafayette, Louisiana.

PERMANENT POSITION—Experienced draftsman in detailing frogs, switches and trackwork for mines and railroads. State age, experience, education and references. West Virginia Steel and Manufacturing Company, P.O. Box 118, Huntington 6, W. Va.

DRAFTSMEN AND Engineers experienced in the preparation of plans and details for structural steel. Also several recent engineering graduates. Work contributes to the war effort but will be continued as usual after war termination. If you are engaged on war work, do not apply unless you can get proper release. Communications treated confidentially. Write fully. P-883, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

WANTED: ONE Engineer and one engineering draftsman for detail design on water, sewage and industrial waste treatment plants. Reply, stating experience. Gannett Fleming Corddry & Carpenter, Inc., Box 366, Harrisburg, Penn.

ENGINEER, thoroughly experienced in water works and sewage treatment design, good draftsman, for permanent position in consultants office. Give outline of experience, personal data, availability, approximate salary requirement and list of references in first letter. P-891, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL DESIGNERS and draftsmen. Charles S. Whitney Consulting Engineer, 724 E. Mason St., Milwaukee 2, Wis.

SANITARY OR civil engineer with background of experience including basic knowledge of sewage treatment processes and plant design for a permanent position with prominent sewage treatment plant equipment manufacturer. Positions open include application engineering in the office and development for sales engineering in the field. Either type of position offers excellent opportunity for advancement and provides practical experience in all phases of sewage treatment. State full details concerning qualifications, type of position desired, starting salary range desired, and personal data in letter of application. P-880, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

(Continued on page 142)

Master Mechanic Wanted

Would like men with experience in maintenance of heavy road building equipment with ability and personality necessary to handle men. These men to be used to develop as Plant Superintendents or Managers in the operation of permanent concrete products plants. Men 35 to 45 wanted. Any experience with concrete will be of added value. Mainly we want mechanically minded men with at least high school education and willing to go anywhere. Address

P-842, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

WANTED
Promotional Engineer

Established technical-service and promotional organization has excellent opening for a graduate civil engineer with experience in the highway field, especially the design and construction of concrete pavements.

Applicants please write, stating age, education, experience record, and salary desired. Reply

P-858, Engineering News-Record
330 West 42nd St., New York 18, N. Y.

WANTED
Industrial Instrument Mechanics

For new Aviation Gasoline Plant. Experienced in repair and adjustment of flow controllers, temperature and pressure regulators, etc. Company has A-1-A employment priority. Essentially a peacetime industry having furnished full time employment for past 20 years. Location, east-central United States. Allowance for moving expenses. In reply give detailed outline of previous experience, education, draft status, and required earnings for 48-hour work week. Reply

P-840, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED
CIVIL ENGINEER (Sanitary)

To fill a vacancy in the Department of Public Works. Open to qualified citizens of the United States. Age Limit: 50 years. Salary: Beginning $3700; Maximum $4400; annual increments of $150. Applications and more detailed information obtainable at the Civil Service Office, City Hall, Dearborn, Michigan.

APPRAISER OF INDUSTRIAL PROPERTIES FOR INSURANCE PURPOSES

Permanent position with high-grade organization. About half-time travel. Give general qualifications, age, and education. Might consider training young engineer or salesman with considerable machinery experience. Applications treated confidential.

P-803, Engineering News-Record
330 West 42nd St., New York 18, N. Y.

SEARCHLIGHT SECTION

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Thirty-third Year

(In the following list, Courses A, B, and C are abbreviated from our complete Structural Engineering course).
A—Public Works Structures.
B—Architectural Engineering.
C—Special Course (State Board Exams, for P.E.)
D—Structural Engineering (complete).
E—Preparatory Course (for non-technical men).

Our Courses are offered principally to

ADULT CIVIL ENGINEERS AND ARCHITECTS

Ninety percent of our engineering students are former graduates (C.E.) from engineering colleges. Our courses have helped thousands of engineers to better positions, increased pay, and success "after forty".

Course B has helped many architects and draftsmen in passing the structural portion of State Board Examinations for license.

Literature sent without expense or obligation. Write TODAY.

WILSON ENGINEERING CORPORATION

College House Offices Harvard Square Cambridge, Mass., U. S. A.

ESTIMATING That CLICKS

A course of instruction for home study has been prepared by a General Contractor with more than 40 years experience. It teaches by a self correcting method, with special instruction if needed, a System of Estimating used by thousands of successful estimators and general contractors for more than 25 years.

This is strictly a course in cost estimating using full scale drawings, and specifications. The instruction covers each successive step that must be taken to prepare an estimate, complete in every detail, for bidding on lump sum contracts. Sold on a money back guarantee basis. For particulars address:

TAMBLYN SYSTEM
Dept. EN
P.O. Box 1465, Denver 1, Colorado

POSITIONS VACANT
(Continued from page 141)

STRUCTURAL STEEL estimator and designer wanted by structural steel fabricator located in central west. Permanent position with a leading concern with retirement pension plan in operation. State qualifications, past experience and salary expected. Will consider young engineer with structural experience who can be trained. P-892, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED ARCHITECTURAL engineering draftsman for layout and detail of structural, plumbing, heating and wiring for consulting office in the South. An older man who wants a permanent job and opportunity. State full details and salary. P-906, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

CIVCIL ENGINEER, under 30, permanent position with eastern railroad. Send full information. P-903, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

EMPLOYMENT AGENCIES

ENGINEERS — MECHANICAL — Industrial — Electrical — Chemical — Civil — Architectural, etc. Our specialized service to Technical and Scientific men only for over 50 years, continuously at the same address enable us to offer a fine selection of positions for high grade Manufacturing Executives, Production Managers, Metallurgists and Technical men of all types. The Engineering Agency, Inc., 53 W. Jackson Blvd., Chicago 4, Ill.

EXECUTIVES WANTED — Industrial, sales, designing refrigeration, electronics and chemical engineers. Good salaries offered with post-war opportunities. Contact us for whatever position you are seeking. Our individual service covers the nation. Shay Agencies, 1009 North State Street, Chicago 10, Ill.

POSITIONS WANTED

AVAILABLE NOW, registered professional civil engineer, experienced in water, sewage and waste disposal design, of plants and systems. Desires position with engineering firm as department head. PW-867, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

CONTRACTORS FIELD Engineer—Thoroughly experienced with building, earth moving, mason contractors. Supervision, layout, estimating. PW-873, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ENGINEER - SUPERINTENDENT, age 43, seeks connection with enterprising contractor, with future possibilities. Graduate CE, registered civil engineer with 20 years extensive construction and design experience on large hydroelectric projects. Thoroughly familiar with estimating, equipment planning, organizing a job and direct-construction. PW-881, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

VETERAN, Age 25, with engineering education wishes position in construction. Location secondary. Experienced in estimating, construction supervision, drafting, contracts, specifications, office engineering and cost. Anything considered. Best of reference. PW-894, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

SALARIED POSITIONS

This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

R. W. BIXBY, INC.
272 Delward Bldg., Buffalo 2, N. Y.

POSITIONS WANTED

ESTIMATOR, Graduate Engineer, with twenty-five years practical experience, wish connection with general contractor. PW-869, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

CONTRACTORS MANAGER, graduate engineer, twenty years construction experience, general contracting future possibilities preferred, qualified to assume complete responsibility. PW-870, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

STRUCTURAL DESIGN engineer. Graduate C.E. Age 42, 20 years experience design steel, concrete and timber structures. Capable of taking charge of all design work and preparation of structural specifications. Recent experience shipways, wharfs and quay walls, power houses, industrial and commercial buildings. PW-882, Engineering News-Record, 68 Post St., San Francisco 4, Cal.

GENERAL CONSTRUCTION engineer and superintendent. Age 36. Make own estimates, supervise work from start to finish. Specialize, sewers, sewer disposal plants, water supply, water treatment plants, waterfront work, reinforced concrete bridges, heavy grading, drainage and railroad work. Prefer salary and bonus basis with progressive contractor in Southeastern states. PW-900, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

CIVIL ENGINEER, graduate, 25 years experience, design, construction, industrial plants, water supply, highways, hydro-electric developments. PW-886, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

CONSTRUCTION ENGINEER age 34 with 9 years experience in highway, commercial, and industrial construction. Presently employed chief construction engineer on large Army installation. Available in January. Consider foreign assignment. PW-901, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

CONTRACTORS ESTIMATOR — Manager, engineer. 25 years in responsible positions, nation-wide scope, qualified to assume complete responsibility for estimates, engineering, negotiations, subcontracts, and supervision. Wide experience on building, industrial, housing, reinforced concrete, masonry, railroad structures, water and sewage treatment, Army and Navy construction. Location immaterial. Estimator, Apartment 210, 4 East 32nd Street, Baltimore 18, Md., Telephone Belmont 7300.

GRADUATE ENGINEER — experienced estimator and utilities engineer. Executive ability. PW-902, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

DESIGNER-DRAFTSMAN with unusually good background in the engineering field, covering a great variety of projects over a period of 20 years. Available early January. Write or wire G. J. Van Mol, 1706 Thornapple Ave., Akron, Ohio.

WORK WANTED

EQUIPPED SURVEY PARTIES for all types of survey or construction work. Any location. Surveyor's equipment purchased. Harwood, 258 Broadway, New York City.

SPECIAL SERVICE

DRAWINGS MADE and checked we can handle additional detailing and checking drawings for structural steel and mics. and orn. iron work. C. L. Fielder Company, Roanoke, Va.

SALESMEN WANTED

WANTED — SALES engineer by west coast manufacturer. Reasonable background of experience in structural and mechanical engineering and with ability to supervise estimating, design and sales. SW-779, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

SALESMEN WANTED

OLD, BUT aggressive manufacturer of a nationally known industrial product needs several Sales Engineers under 30 for permanent post-war positions. Basic engineering training necessary but need not be graduate. Salary plus car and expenses. SW-749, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED—Structural Engineer trained in reinforced concrete design and construction and sales engineering. Position permanent. Some traveling. Location Wisconsin. SW-813, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED: SALES engineer, age under 35, to work in southern United States. College degree required, preferably in civil or chemical engineering. Bituminous paving experience essential. Applicant selected will be given short training course in the use of our products. This is a permanent connection for a capable energetic man. In own handwriting give age, draft status, general outline of experience and salary expected. Include recent photograph. SW-905, Engineering News-Record, 520 N. Michigan Ave., Chicago 11, Ill.

SALESMAN AVAILABLE

CONSTRUCTION EQUIPMENT salesman. Sixteen (16) years experience desires connection with good A#1—manufacturer of construction equipment, covering the state of West Virginia. A#1 reference furnished. SA-904, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

BUSINESS OPPORTUNITIES

ENGINEER-CONSULTANT — executive, expert in engineering and construction work in Latin America, with licenses and some clientele in various countries, wishes to form new organization for U. S. and South America expansion, in association with established engineering firm or successful practicing engineer covering field of waterworks, sewerage, hydraulic, power plants, buildings, structures, harbor terminals, industrial development. Will invest substantial amount. BO-907, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

FOR SALE Gen contracting company have good offices, shop, and storage yard. BO-908, Engineering News-Record, 68 Post St., San Francisco 4, Cal.

PATENTS ATTORNEYS

PATENTS, TRADE MARKS, booklet, "General information Concerning Inventions and Patents and Fee Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 454, 815 15th St., N. W., Washington 5, D. C.

WANTED

TRANSITS AND LEVELS accurately repaired, also bought, sold or rented; quickly. first class service, Griner, 903 Grand Ave., Kansas City, Mo.

WANTED

POST WAR PRODUCTS

We have Modern Building suitable for manufacture of Heavy or Semi-Heavy Metal Products. 120,000 sq. ft. Electric Power. Steam Plant for heating and processing. Air Supply. Docking and Railway facilities.

We welcome inquiries from U. S. Manufacturers desiring a Canadian outlet for their product.

THE CANADIAN BRIDGE COMPANY LIMITED
Walkerville, Ontario

(Additional selling opportunity ads on opposite page)

WELL ESTABLISHED MANUFACTURER DESIRES AN INDEPENDENT ORGANIZATION TO HANDLE ITS SALES OF

CRANES & SHOVELS—½ & ¾YARD—MODERN, WELL DESIGNED

NOW SOLD TO THE ARMED FORCES EXCLUSIVELY MANUFACTURED AS A SELF-PROPELLED, RUBBER TIRED OR STANDARD CATERPILLAR TYPE—ALSO DESIGNED FOR MOUNTING ON SIX WHEEL TRUCKS

IF YOU ARE A MANUFACTURER OF CONSTRUCTION MACHINERY OR HEAVY TRUCKS AND HAVE A LARGE SELLING ORGANIZATION, WE SOLICIT YOUR INQUIRY.

RW-889, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

OPPORTUNITIES

For Salesmen, Engineers, District Agents For Steel Products

If you have had experience in steel building products and are interested in a permanent connection with a real future, correspondence is invited regarding the various opportunities opening up in our organization.

Products include Steel Windows and Doors, Concrete Reinforcing Bars, Wire Fabric, Steel Forms, Steel Joists, Metal Lath, Light Structural Fabrication. Sales territory includes the Western States and Export.

All replies will be strictly confidential. Give full particulars on qualifications, including age, education, experience, salary expected, and references.

SOULE STEEL COMPANY

1750 ARMY STREET SAN FRANCISCO 24, CALIF.

District Sales Representatives

To Sell

Earth-Moving Equipment

out of

CHICAGO
CLEVELAND
ST. PAUL

Three excellent opportunities for qualified heavy construction-equipment salesmen interested in earning $10,000 and more per year. In writing for further information, please furnish complete outline of qualifications and previous employment experience.

SW-846, Engineering News-Record
330 West 42nd Street, New York, N. Y.

FOR SALE OR RENT

COMPLETE MACHINE SHOP with Overhead Trolley, Double Railroad Siding, Four Acres of Storage Space.

Reply to
P. O. Box 1707, Wilmington, Delaware.

FOR RENT

TRUCK CRANES FOR HIRE
DERRICKS — HOISTS
CONTRACTORS TOOLS
SOLD — RENTED
KARL KOCH
362 Casanova St. Bronx 59, N. Y.
Dayton 9-7474

FOR RENT
4—D8 Tractors with 15 C.Y. Scrapers
2—D7 Tractors with Angledozers
3—12 Ton Buffalo Springfield Rollers
1—315 Worthington Cat. Diesel Compressor
3—8 yd. Linn Haftrak Tractors
N. R. CORBISELLO
36 Tompkins St. Binghamton, N. Y.

FOR RENT
MOTOR GRADERS
CHARLES H. HOCH
424 N. Madison St., Allentown, Pa.

FOR RENT OR SALE
1¼ cu. yd. Bucyrus Erie shovel, rebuilt, first class; also Model 160 Buckeye Trencher.
FR-890, Engineering News Record
330 West 42nd St., New York 18, N. Y.

PUT

"United—Rebuilt"

HOISTING EQUIPMENT ON THE JOB

GASOLINE DOUBLE DRUM HOISTS

1—Clyde, powered by V12, 125 H.P. Zephyr engine, 3 speed transmission, 10,000 lbs. Line Pull

1—National, powered by V12, 125 H.P. Zephyr engine, 3 speed transmission, 10,000 lbs. Line Pull complete with attached swinger

2—Lidgerwood, powered by V8, 100 H.P. Mercury engine, 6,000 lbs. Line Pull

ELECTRIC DOUBLE DRUM HOISTS

1—Thomas, powered by 150 H.P. A.C. motor Cableway or scraper hoist

1—Lidgerwood, powered by 80 H.P. A.C. motor, 9,000 lbs. Line Pull, with swinger

1—Lambert, powered by 80 H.P. A.C. motor, 9,000 lbs. Line Pull, with swinger

1—Lambert, powered by 60 H.P. A.C. motor, 9,000 lbs. Line Pull

STEAM HOISTS

1—Double Drum American, 10x12, front drum capacity, 27,000 lbs. pull, rear drum capacity 13,500 lbs. Line Pull

1—Triple Drum National 8½x10

1—Lambert 10 x 12 Mast and Gaff Hoist

INCLINE OR SHAFT HOISTS

1—Clyde, powered by 100 H.P. A.C. electric motor. Line Pull 8,200 lbs. at 340' per minute

1—Clyde, powered by 100 H.P. A.C. electric motor. Line Pull 12,000 lbs.

GAS & ELECTRIC THREE DRUM HOISTS

1—Maine, powered by a 52 H.P. A.C. Motor. Line Pull 6,750 lbs. with swinger

1—Sullivan, Class CA-311 powered by 40 H.P. A.C. motor

SINGLE DRUM HOISTS GAS & ELECTRIC

12—Lambert, powered by V8, 100 H.P. Mercury engines, 2,500 lbs. Line Pull

1—National, powered by 35 H.P. Buda engine, 3,500 lbs. Line Pull

1—Lidgerwood, powered by 60 H.P. A.C. motor, 6,000 lbs. Line Pull

1—Lidgerwood, powered by 40 H.P. A.C. motor, 2,000 lbs. Line Pull

1—Lidgerwood, powered by 35 H.P. A.C. motor, 2,000 lbs. Line Pull

1—Lambert, powered by 60 H.P. A.C. motor, 2,000 lbs. Line Pull

1—Lidgerwood, powered by 60 H.P. A.C. motor, 4,000 lbs. Line Pull

STEEL STIFF LEG DERRICKS

1—American mounted on structural steel traveler having four 2-wheel swiveling trucks, 20" diameter wheels. Mast 38' high, boom 109' long, 15' gooseneck extension, 20' dia. bullwheel. Capacity 20 tons @ 30' radius; 10 tons @ 98' radius; 4 tons on gooseneck extension.

5—40 tons capacity C hooks.

GASOLINE LOCOMOTIVE

1—Plymouth 8 ton gasoline driven, 36" gauge

VERTICAL STEAM BOILERS

1—100 H.P. Erie City Iron Works boiler overall size 67"x146"

1—45 H.P. International Boiler Works over-all size 50"x102"

UNITED HOISTING CO., INC.

SHEFFIELD AND RAILROAD AVES.

P. O. BOX 392 ENGLEWOOD, N. J.

Tel. Englewood 3-8980

FOR SALE—IMMEDIATE DELIVERY

Guaranteed Used Equipment

Backed by Our 21 Years of Service to the CONSTRUCTION INDUSTRY

AIR COMPRESSORS & TOOLS

Ingersoll-Rand

1—500 cu. ft. actual air, 2 stage, model XOB electric motor drive, 4 wheel or steel skid mounting.

1—315 cu. ft. actual air, 2 stage, gas engine drive, 4 steel wheels.

4—310 cu. ft. P.D. single stage, 217 cu. ft. actual air, type 20, 10" x 8", gas engine drive, 4 wheels.

Chicago Pneumatic

2—315 cu. ft. actual air, 2 stage, gas engine drive, 4 steel wheels.

Gardner-Denver

2—360 cu. ft. P. D. single stage, 260 cu. ft. actual air, gas engine drive, 4 wheels (one on solid rubber, one on steel).

Cleveland

3—Wagon Drills, D-14.

HIGH PRESSURE, CENTRIFUGAL JET PUMPS, GAS ENGINE DRIVEN

4—3" x 3" COMPLETE single stage, 350 GPM, 140 lbs.

5—4" x 3" COMPLETE two stage, 350 GPM, 194 lbs.

1—4" x 3" LeCourtenay five stage, 350 GPM, 217 lbs.

1—6" x 3" COMPLETE three stage, 1200 GPM, 109 lbs. 600 GPM, 208 lbs.

PUMPS

4—COMPLETE 10" special self priming centrifugal pumps, 5000 gallons per minute, gasoline engine or electric motor drive, skid mounted.

All the equipment in our stock (more than 400 pieces) is available on a rental basis, such as: Ingersoll-Rand portable Air Compressors up to 500 cu. ft., McKiernan-Terry Pile Hammers up to 10B3, Mall Vibrators and pneumatic Chain Saws, Universal gasoline engine driven AC, DC Generator Sets, Marlow Pumps up to 10" centrifugals.

Wire: Q.M.P. Western Union L.I.C., N.Y. **Phone: Ironsides 6-8607**

Write:

COMPLETE Machinery & Equipment Co., Inc.

36-42 Eleventh St., Long Island City 1, Queens, N. Y.

20" Portable steel hull electric dredge

15" Portable steel hull electric dredge

20 Steam turbine wooden hull dredge

6-Yd. clam shell steel hull dredge could be used as derrick boat

30" Plain suction electric dredge or booster

4—30" Dredge pumps

8" Dredge pump

1—4-Yd. dipper steel hull dredge

1—14 Yd. dipper steel hull dredge

H. P. GUION

303 West 42nd St. N. Y. C.

Telephone Circle 6-0919

A DEPENDABLE SOURCE for

HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS — TRACTORS — ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON YOUR SURPLUS

B. M. WEISS CO.

Girard Trust Bldg. Phila., Pa.

TRUCK CRANES

CUSTOM ASSEMBLED

Result of Years of Experience

Capacity 5 to 25 ton

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One-Ton Pug Mill—Steam Jacketed
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100 H.P. Waukesha Gas Engine (like new)
Erie City Steam Engine
3 Compartment Steel Bin—25 Ton
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80 H.P. Scotch-Marine Boiler—110 lbs. Pressure
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6,000 Gal. Tank—Mounted on Ry. Trucks
65 Ft. Steel Railway Car—All Steel Hoppers, Chain, Chutes, Pipe, Valves, Etc.

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REBUILT — READY TO WORK

1—National Model 906 Single Drum Hoist, 20 H.P. gasoline engine.

1—Smith Paver 27E, Waukesha engine model 6KS-39A.

2—Koehring Trail Dumps with Diesel Motors, $7500.00 ea.

ALSO

2—Ingersoll-Rand single stage air compressors model 310' powered by Waukesha 4 cylinder gasoline engines.

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FOR SALE

Model 5120 Marion Electric Dragline with 100' boom and 3 yard dragline bucket. Excellent condition.

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TRUCK CRANE

1—½ yd. Universal Truck Crane, 24' boom mtd. on Md. 2 AC. Mack truck, 6 hard rubber tired wheels.

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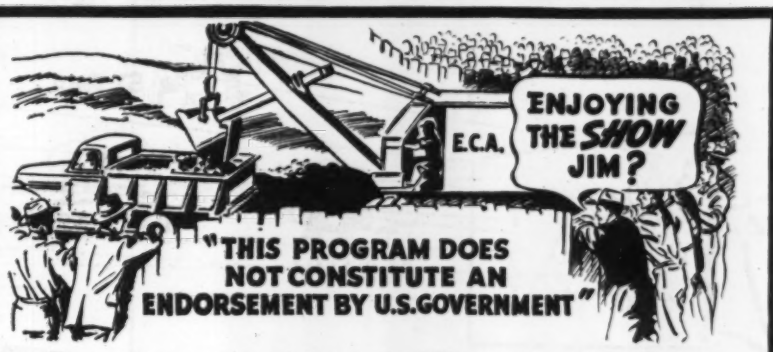
TWIN CENT. PUMPS

2 — 10x8" Allis Chalmers, Ser. #19674 & 19673, power 500 H.P. elect. mtr., 2200 V. Cap. 3300 GPM @ 100# pressure ea.



True—the government does not endorse any product. But we are justly proud of the fact that we have furnished a great deal of equipment for important government jobs.

CLAMSHELL BUCKET

1—5 yd. Kiesler bucket Style N, digging or rehandling, NEW 1943, Wt. 11,500#

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ELECT. CRANE

1—18 Ton O & S, type B Crane, mtd. on 8'-0" ga. track, 50' boom, Power 52 HP 440/60/3 elect. Mtr.

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1—1190 cu. ft. Ing. Rand 2 stage comp. Requires 206 H.P. to operate at 100 lb. pressure.
1—840 cu. ft. Sullivan, 2 stg., with 150 H.P. A.C. elect. mtr.
1—309 cu. ft. Chgo. Pneu. air comp., power 2 cy. Diesel engine
1—347 cu. ft. Sullivan, class W13, 2-stage comp. power 112 H.P. Diesel engine.
1—200 cu. ft. Chgo. Pneu. comp. power Diesel engine.
1—Air receiver, 60 dia. x 120' long.

PORTABLE:

1—315 cu. ft. LeRoi, 2 stg. mtd. on 4 pneu. tires.
1—210 cu. ft. Ing. Rand, 2 stg. mtd. on 3 steel wheels.
5—160 cu. ft. 2 stg. Ing. Rand, LeRoi, Davey and Worthington, on pneus. and steel wheels.
6—105 cu. ft. 2 stg., C.P.T., Ing. Rand and Davey, mtd. on pneus. and steel wheels.
Also a number of sgl. stg. port., 110 to 330 cu. ft. disp'l.

BUCKETS

40—Various sizes, Clamshell, dragline, dragscraper, orange peel. All makes.

CONCRETE MIXERS

A large stock of concrete mixers, 5 to 28 cu. ft. gas or electrical power, with or without power skips.

HEATERS (Concrete Torch Type)

2—#24 Aeroil, mixers 3 to 5 cu. ft.
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3—#47 N. Aeroil, 1600 G.P.H.
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3—#45 Aeroil, 750 G.P.H.
5—#312 Hauck, 1380 G.P.H.
12—Hauck, single coil, oil burning.
1—#16 Hauck, oil burning.
55—Coke burning water heaters.
13—Aeroil THAWING TORCHES.

All this equipment is owned by us and may be inspected at one of our plants.

CRANES AND SHOVELS

1—1¼ yd. Koehring Mdl. 501 Ser. #1071, with 70 ft. boom.
1—1¼ yd. Erie gas Model GA2 Serial #9758, with 45' boom and shovel attachment.
1—1 yd. Marion, mdl. 440, ser. #5961, 50' boom.
1—1 yd. Model 600 P & H, Serial #3502, 40' boom & backhoe attach.
1—¾ yd. Conco, Serial #1304, 30' boom.
1—½ yd. P & H shovel, Model #204, Serial #2303, gasoline powered.
1—⅜ yd. Erie Model B2 crawler crane, steam powered, Serial #4027, with 50' boom and shovel attachment.

LOCOMOTIVE CRANES

3—25 Ton Loco. cranes, Browning & Industrial, Ser. #1724, 1720 and 2811, oil fired, 40-45' boom.
1—25 Ton Ohio, Mdl. E, Ser. #3722, steam power, 40' boom.

SCALES (Wheelbarrow)

3—Johnson "Little Titan," 3 beam.
8—Howe and Fairbanks-Morse, 3 beam.
4—Winslow, 3 beam.
1—Gaston, 3 beam.
1—Fairbanks-Morse, 2 beam.
1—Gaston, 2 beam.
2—Johnson "Little Titan," 2 beam.

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Cleveland baby trencher model 95.
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D-7 caterpillar angledozer, Laplant choat blade.
D-4 caterpillar highlift.
105 Northwest shovel front, 1 yd. complete.
Browning crane and backhoe comb. ½ yd.
Locomotive 100 T standard gauge.
HD-10 Allis Chalmers diesel angledozer.
Air compressors all sizes.
Stone and coal crushers.

AIR COMPRESSORS RENTAL CO.
2324 East 105th St., Cleveland, Ohio

Int. Diesel TD-14 Tractor with Bulldozer, and double drum winch.
45 ft. Crane Boom. Also Pullshovel Attachment for Lorain 75A or 75B.
1¼ Yd. Byers Gas Shovel
1 Yd. B-Erie Gas-Air Shovel
Caterpillar 30 KW Diesel Electric Set.
International 20 KW diesel Electric Set.
Ing-Rand Diesel 500' Compressor.
14 ton Whitcomb Loco-Gas-36 Ga.
20 ton Plymouth Loco-Gas-Std. Ga.
27-E Smith Paver, Model H-31.
Hayward 2 Yd. Orange-Peel Bucket.
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2—Shovel Attach. for Byers Bearcat Jr.
Shovel attachment for 41-B Bucyrus-Erie.
McK-T. Pile Hammers, 3, 6, and 7.
1—10 ton Buf-Springfield Roller, 3-Wheel, Gas, with scarifier.

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CRANES & SHOVELS

Marion #37—1¾ Y Steam Crane—90' B—#6000, 60" Code Boiler.

LOCOMOTIVE CRANES

1—Ohio Model CD—20-ton—#3643—50' B—D.D.—Code boiler. Excellent.
1—Lorain 75-D—20-ton—#5220—gasoline 8-wheel crane—50' B—D. D.
1—Industrial 30-ton—Code boiler—single drum—65' boom. Very good.
Industrial 25 ton—Single Drum—60' B—Oil Fired Code Boiler. Fine cond.
Link Belt 20 ton #968—Electric—D. D.—50' Boom Cast Steel Truck Frames. Excellent.

"SPECIAL"
2—Link Belt—5 yard—19' ga.—100' boom—full revolving steam cranes. Like new. Cheap.

MISCELLANEOUS

1—Chi-Pneu. 15 x 9 x 10—664' Diesel Compressor.
1—Link-Belt K44—1½-Yard Backhoe Attachment.
1—Southwark 3-SE Vert. Punch & Shear—Motor attached. Excellent.
McMyler Portal Gantry Structure. Will accommodate any 25 ton capy. Crawler or Loco. Crane. Never used. Very cheap.

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Will pay cash for any modern const. equipment.,
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1—1¾ yd. Marion Shovel-Crane-Backhoe
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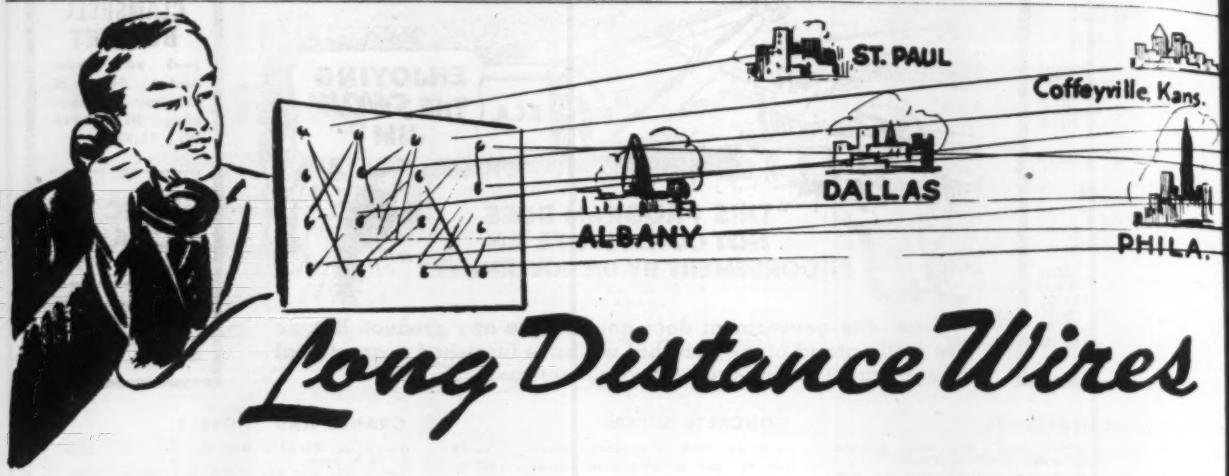

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ALL of them—hard-boiled, practical BUYERS—are calling us NOW, from all over the Country and ordering shipment of:

- TRUCK-CRANES • MONIGHAN DRAGLINES • 4 to 8-Yd.
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BECAUSE: They know that we have long lists ready to draw from.

They appreciate our PRINTING ALL PRICES.
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Look over this list below and satisfy yourself.

JANUARY 1945 SPECIALS

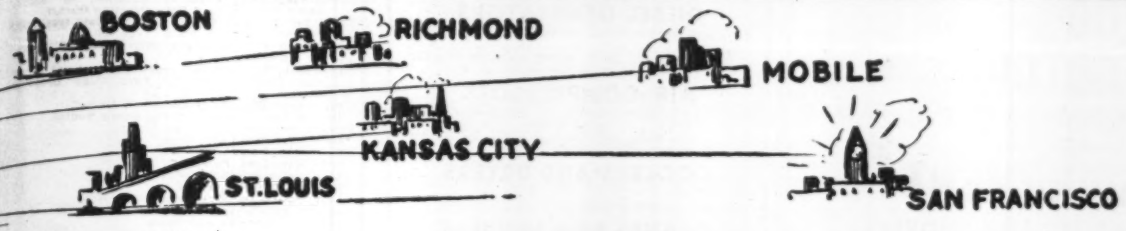
⅝ yd Northwest Model 20 shovel and dragline, rebuilt and guaranteed, late model
⅜ yd recent model Insley K-10, excellent condition shovel, crane, backhoe, clamshell bucket, 60 day guarantee
½ yd P&H Model 150, excellent condition, shovel, backhoe, crane, two clam buckets, 10 wheel trailer
½ yd Northwest Model 2 shovel built in 1936
⅝ yd diesel Link-Belt Speeder shovel, 1940-1941 model excellent condition
½ yd Unit shovel and backhoe combination, ¾ swing, real nice machine $2950.
Two Byers Bearcat ⅜ yd skimmer, crane and shovel combination $1650. each
Half swing Insley 1/3 yd shovel in rather good operating condition at a bargain price $1950.
½ yd Bay City Model 25 shovel, backhoe combination, 1939 model, excellent condition
½ yd Industrial Brownhoist scraper shovel $1450.
⅝ yd Bucyrus-Erie 10/20 shovel, backhoe and solid tired trailer $4900.
½ yd Byers ¾ swing, Hercules 4-cylinder engine $2750.
½ yd Byers Model 28—30' boom, $3100.
½ yd General dragline, 35' boom, Page dragline bucket. $4900. a 1938 General ½ yd shovel and dragline combination—35' boom—½ yd bucket—6-cylinder Buda gas engine—rebuilt and guaranteed
½ yd Model R Insley shovel and backhoe combination. Condition only fair. Price $2950.
½ yd Link-Belt Speeder Model B-3 shovel in rather good operating condition at a bargain price. $3450.
⅝ yd Byers Model 66 crane, backhoe and fairleads. Condition good. $5900.
½ yd P&H Model 200. Fair condition. $2200.
¾ yd Bay City Model 16B—2 skimmer buckets and backhoe—half revolving. $1650.
A 1941 ¾ yd Byers Model 83 backhoe, shovel and dragline combination—rebuilt and guaranteed
A 1939 Marion Model 331 backhoe and shovel combination—¾ yd capacity—rebuilt and guaranteed
Keystone ¾ yd excavator $1750.
Lorain Model 40 shovel and dragline combination—¾ yd capacity
¾ yd Northwest Model 3 shovel and dragline—exceptionally good buy for $6450.
¾ yd P&H combination shovel and crane with fairleads—entirely rebuilt and guaranteed. Price $6300.
1 yd Byers serial number in the 3600s with 60' boom—powered by Hercules. Price nominal—only $4400.
1 yd Late model Koehring Type 376—entirely rebuilt top to bottom. Price $8750 which is way under its market value
1¼ yd Linkbelt 1935 or 1936 model, 65' dragline boom, shovel attachments. Light weight Page bucket, $8400.

REBUILT LORAIN
75-B 1½ YD. SHOVEL
With 70-ft. Dragline and Crane Boom and Fairleads. New Streamlined Cab.
REBUILT GUARANTEED
Location New York City.
Lease or Sell

One ½ yd. P&H Model 300A shovel and dragline combination excellent condition. Rebuilt and guaranteed. Real buy for $5100.

¾ yd Northwest Model 25 backhoe and dragline combination. Built in 1939
¾ yd Northwest Model 105. An old unit but still in good operating condition with Climax 4-cylinder engine. $4850.
¾ yd P&H Model 204 dragline, 35' boom. $4900
¾ yd P&H 206, $2900 including bucket
¾ yd P&H 400 Shovel. $4750.
1 yd Bucyrus-Erie 30B Diesel crane, powered by Atlas Diesel Engine. An old model but still a good buy
1 yd Lorain 60A shovel and dragline combination. Entirely rebuilt
1 yd Lorain Model L55 in exceptionally good condition
Two 1 yd Koehring Model 301
1 yd Northwest Model 101 in fair condition. $3300
1 yd Diesel Osgood shovel and dragline. Caterpillar Diesel Engine. Unit is in good condition. $9400
1¼ yd Byers Shovel and Dragline combination. Good condition. Price exceedingly low $7900
1¼ yd Lima Model 101 shovel and dragline combination. Price reasonable
1¼ yd Lorain 75A shovel. $9450
A rebuilt Lorain 75B shovel, crane and dragline combination. $11,900 with 60 day rebuilt guarantee
1¼ yd Northwest Model 4 in real good condition and very reasonably priced
1½ yd Northwest Model 6 shovel and dragline combination, with rebuilt guarantee
1—¼ yd Osgood shovel
1—¼ yd P&H Model 700B shovel and dragline combination 60' boom $7400
1—½ yd Bucyrus-Erie 37B shovel. One of the best buys we know of $11,300
1—½ yd P&H Model 700B shovel and crane combination price $7300
1—½ yd Koehring 501A shovel. Needs certain amount of repairs. Price way under its value $7700.
1—½ yd Koehring shovel Model 502—Caterpillar diesel engine. Reasonably priced
1—½ yd Lorain Model 77 shovel and dragline combination—45' dragline boom—rebuilt and guaranteed
2 yd Bucyrus-Erie diesel shovel and dragline combination—needs a certain amount of work $12,250.
1—¾ yd Koehring 701 shovel and crane, powered by Caterpillar 13,000 diesel engine
2 yd P&H Model 780 diesel dragline—75' boom
2 yd Page dragline—60' boom—Page diesel engine
2½ yd Bucyrus-Monighan walking dragline diesel powered 82' boom
3 yd Monighan diesel 90' boom—Fairbanks-Morse diesel engine—condition good
2 yd Bucyrus-Erie 43B electric tunnel shovels
2 yd Bucyrus-Erie 50B electric shovel
4 yd 120B Bucyrus-Erie electric shovel
Two 3 yd Marion electric shovels Model 125
7 yd Bucyrus-Erie electric shovel
This is only a partial list of shovels, cranes we offer for sale.
We suggest you wire or telephone immediately for a summarized proposal.
Steam shovels from ¾ yd up to 8 yds.
Description will be sent upon request.

ECONOMY COMPANY, INC.
NEW YORK



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6 Super C Tournapulls, 1942 Models, Maryland $10,-200.00 each

5 Super C Tournapulls, rebuilt, West Coast $10,300.00 each

5 Model A 23 yd Tournapulls. A great bargain. Minnesota. $11,200.00 each

2 Model C Tournapulls $6300.00 each

DUMP TRUCKS

4—Sterling 7½ ton 1940 Models, 1050x24 tires, excellent condition $4950.00 each

4—1941 Sterling 7½ tons 1100x24 tires $5500.00 each

3—1941 Ford dump trucks $1375.00 each

3—Euclid 10 yd trucks with Cummins diesel engines, tire size 1800x24 $5900. each

3—20 yd Maxi two way side dump trucks—price upon request

10—10 yd Euclid gas dump trucks $4300.00 each

We can offer several other dump trucks and Complete listings on small and large diesel and gas dump trucks and semi-trailers will be sent upon request.

SPECIAL

1—Diamond #35 Rotor Lift Vibrator Gravel Crushing and Screening Plant, equipped with dual pneumatic tires. Engine RODB-20 Model #35-SC6 Heavy Duty motor, radiator, pulley and parts completely installed. Extra screens, belts, etc. Powered by gas.
Attractively priced, which will be given upon request.

TRAILERS

4—Athey trailers with Linn tractors, late models, excellent condition, New England

1—35 ton Williams trailer with 12 large pneumatic tires, rebuilt $3800.00; $1000.00 under ceiling

1—50 ton trailer with double drive Autocar, exceptionally good condition. Price upon request

1—15 ton shovel trailer, 6 pneumatic tires 40x8, mechanical brakes, excellent condition $980.00

1—1941 Freuhauf 14' dump semi-trailer 15½ yd capacity, excellent condition $3900.00

10 other small and large trailers, description will be sent upon request

TRACTORS

4—International TD-18 tractors with hydraulic bulldozers, rebuilt and guaranteed condition. $6700.00 each

1—D-8 Caterpillar Tractor with LeTourneau Angledozer and 12 yd LeTourneau scraper and other accessories. $12,350.00

1—RD-8 tractor with bulldozer, double drum power unit, 12 yd scraper. $12,250.00

1—D-8 Tractor with down pressure hydraulic bulldozer, serial 9G3546. $4700.

1—Caterpillar 60 Tractor with Bulldozer, 10' blade. $1950.00

1—Model 4 Caterpillar Tractor with LaPlante Choate brand new hydraulic bulldozer. $3900.

1—R-2 Caterpillar tractor with LePlante Choate Bulldozer. $2100.

TRUCK CRANES

1—Quickway Shovel and Crane Combination, 35' boom, 1000x24 brand new pneumatic tires, 6 ton capacity

1—P&H Model 300—8-10 tons, 10 wheeler AC Mack truck, 1100x24 Budd wheels. Rebuilt guarantee

1—Universal crane in excellent rebuilt condition on 10 wheeler Hendrickson truck, large tires

1—P&H Model 203—7 to 9 tons, 6 wheels 900x24, 45' boom, $7600.00 a real bargain

1—Speeder truck crane, 7½ tons, 25' boom, mounted on White Truck $3900.

1—18 ton Byers truck crane on 10 wheeler, specially constructed Mack truck, 65' boom, rebuilt and guaranteed

1—Lorain 40—12 to 15 tons, 70' boom, 10 wheeler, special Mack chassis 1100x24 tires, $11,800.00

BUCKETS

1—¼ yd Orange Peel bucket—rebuilt and guaranteed $225.

1—1 yd Blawknox single line bucket $620.00

1—¾ yd Kissler clamshell bucket rebuilt $495.

1—½ yd Williams clamshell digging bucket very good condition $435.00

1—½ yd Page dragline bucket

1—½ yd Owens clamshell digging bucket

1—⅜ yd Owens clamshell bucket

1—1 yd Hayward clamshell bucket

1—1½ yd Page clamshell bucket

1—Hales ½ yd rebuilt dragline bucket

1—1½ yd Page dragline bucket

1—2 yd Page dragline bucket

1—Owens 5 yd clamshell bucket

Additional listing on buckets—over 110 in all will be gladly sent upon request.

TRUCK CRANES

TRACTORS

DUMP TRUCKS

BUCKETS

OVERHEAD CRANES

LOCOMOTIVE CRANES

PAVING EQUIPMENT

MIXERS

TRAILERS

CRANE ATTACHMENTS

GRADERS

TRENCHERS

Complete listing on each of these items will be forwarded promptly on request.

49 Vanderbilt Ave N.Y.C.

TELS. MURRAY HILL 4-2294-8292-2295-2296

100% FACTORY REBUILT EQUIPMENT

CRANES AND SHOVELS:

1—P&H model 206 gasoline crane with 40 ft. boom—completely rebuilt.
1—75-B Lorain Combination Shovel and Crane. Gasoline engine driven—Rebuilt. Serial No. 4718.
2—16B Bay City ¾ yard combination skimmers and backhoes.
1—Shovel front for Lorain model 77 (1½ yd.) excellent condition.
2—Shovel fronts for Lorain model 75B — excellent condition.
1—50' Heavy Duty Boom for 25-Ton Browning Locomotive Crane.
2—Lima Model 101 1¼ yd. Combination Shovels and Cranes.
1—Bucyrus-Erie gas-air Caterpillar Crane.

HOISTS:

2—Clyde 50 H.P. double drum gas. hoists.
1—Lidgerwood 60 H.P. double drum gasoline hoist.
1—Lidgerwood 75 H.P. double drum gasoline hoist.
1—Lambert 86 H.P. double drum gasoline hoist—practically new.
1—American 100 H.P. three drum gasoline hoist.
6—Lidgerwood double drum electric hoists —60 H.P.—Atwell type.
4—Lidgerwood double drum electric hoists —80 H.P.—Atwell type.
1—American 104 H.P. three drum elec. hoist.
4—8¼x8 single drum Lambert steam hoists.
1—7½x10 double drum Lambert steam hoist with 44" diameter boiler.
2—8½x10 double drum Lambert steam hoists with 48" diameter boiler.
2—8½x10 double drum National steam hoists with or without boilers.
1—8x10 3 Drum Mead Morrison Skeleton Steam Hoist — Quadrant Control with Independent Swinger.
1—9x12 three drum National skeleton steam hoist, quadrant control.
1—10x12 two drum Flory steam hoist—54" diameter boiler 150 lbs. pressure—duty 13,000 lbs. on a single line.
Third drum units and swinging gears for Lidgerwood steam, gas and electric hoists.

MISCELLANEOUS:

1—Worthington air compressor — steam driven 8x8½x9, used less than 1 year, with 36x96 vertical air receiver — 150 cu. ft. per minute.
2—Worthington centrifugal pumps—8"—1800 GPM at 45 ft. head, complete with 30 HP AC motors and starters.
3—Two and three stage centrifugal pumps —250 to 350 ft. head—elec. motor driv.

Various portable gasoline engine driven air compressors from 120 to 360 cu. ft.

International Hoist & Machine Co.
556-558 Ferry St. Newark 5, N. J.

DIESEL GENERATORS

1—Diesel Generator Set, 300 HP., Fairbanks-Morse Diesel, 6 cylinder, Model 32, complete with auxiliaries, 257 RPM., direct connected to a 250 KVA Fairbanks-Morse Generator.

AIR COMPRESSORS

1—Ingersoll-Rand Duplex Air Compressor, Type XB, 582 cu. ft. motor driven.
1—Ingersoll-Rand Imperial Type XB-2, Duplex Air Compressor, 12"x7½"x12".

COOLERS AND DRYERS

1—7x56 ft.
1—10x90 ft. And Others.

CRANES AND SHOVELS

1—P & H 1-yd. Shovel, Gasoline, Reconditioned.
Locomotive Cranes. All sizes & types

CRUSHERS

2—No. 5-6-8 Gates Gyratory Crushers, Style D. Others—various types and sizes.

HOISTS

1—8. Flory Mfg. Co. single drum Hoist. Handles 11 ton car up 12% grade 500 ft. per min.

KILNS

1—8x91½x180 ft.
And others.

LOCOMOTIVE AND CARS

1—4-ton Vulcan Iron Works, Class AW-4, Worm Gear Gasoline Locomotive, 36" gauge.
6—5-yd. Koppel 2-way Dump Cars, 36" gauge.

DRILLING EQUIPMENT

1—No. 33 Ingersoll-Rand Leyner Drill Sharpener.
1—Improved Type No. 22 electric power Loomis Machine Company Clipper Drill, complete with motor.
2—Ingersoll-Rand DCR No. 430 Drills.
2—Denver-Gardner Company (Turbo-Waugh) No. 37 Drills.
4—Denver-Gardner Company (Denver-Waugh) No. 95 Drills.

FEEDERS

2—Bailey Pulverized Coal Feeders, Type No. 2, complete with steel hoppers, 8½ ft. dia. x 12 ft. cone bottom.

GRINDING EQUIPMENT

2—5½'x22' Allis-Chalmers Tube Mills.
3—5½'x20' F. L. Smidth Tube Mills. Silex Lined.
1—5'x22' Tube Mills.
1—5'x10' Tube or Ball Mill.
1—4-roll Raymond Mill.
3—Giant Griffin Mills.

ELEC. MOTORS & MG SETS

Large stock, rebuilt, AC or DC. 60 and 25 cycle.

AIR SEPARATOR

1—14 ft. Sturtevant Air Separator. New 1941.

TRACK SCALE

1—Homestead (Carnegie-Illinois Steel) Standard Track Scale, 46'-100 ton capacity. Complete.

TURBINE

1—100 H.P. and others up to 1500 KW

WEBBER EQUIPMENT CO.
17 East 45th St. MU. 2-6511
NEW YORK 17, N. Y.

LOCOMOTIVES

1—20 ton Plymouth gasoline standard gauge serial #3112.
1—20 ton Whitcomb diesel 36" gauge serial #40019.

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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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14"	6	8"	6	4"	5
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12"	5	6"	6	3"	4

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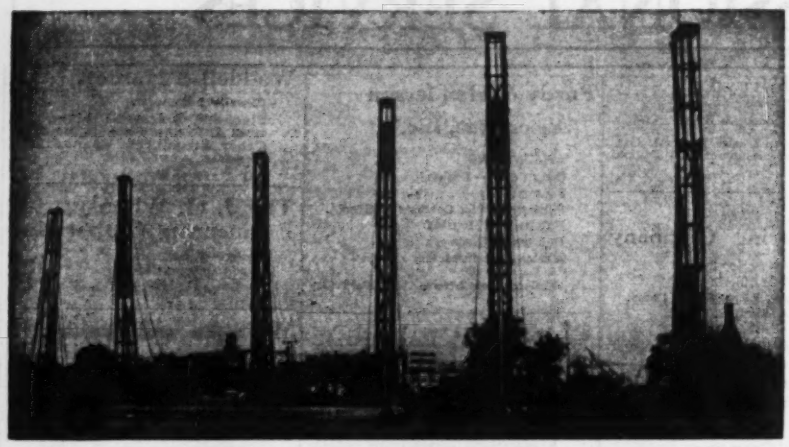

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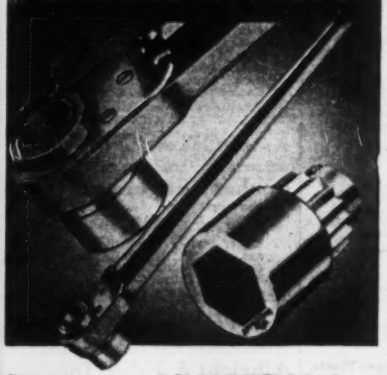

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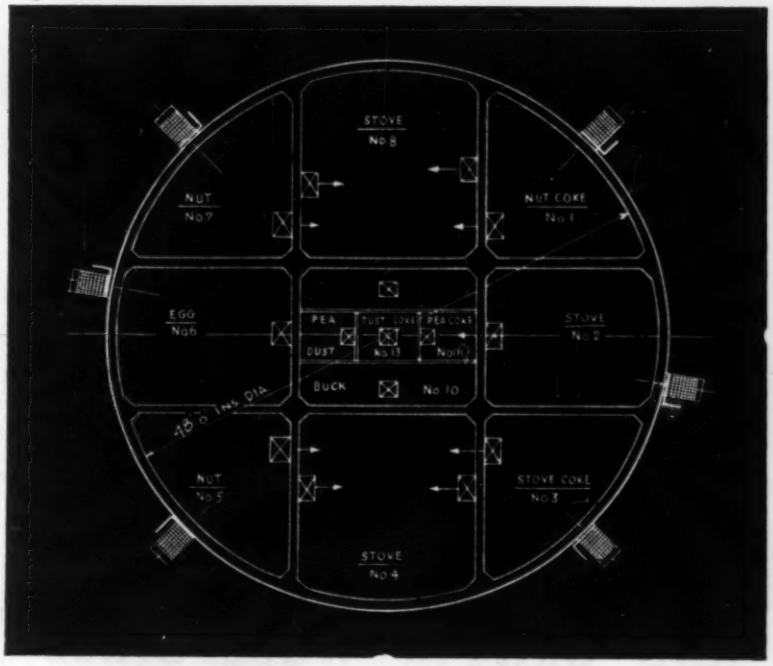

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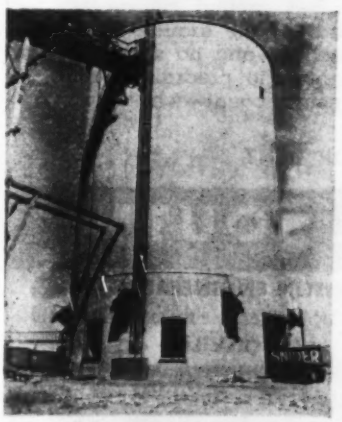

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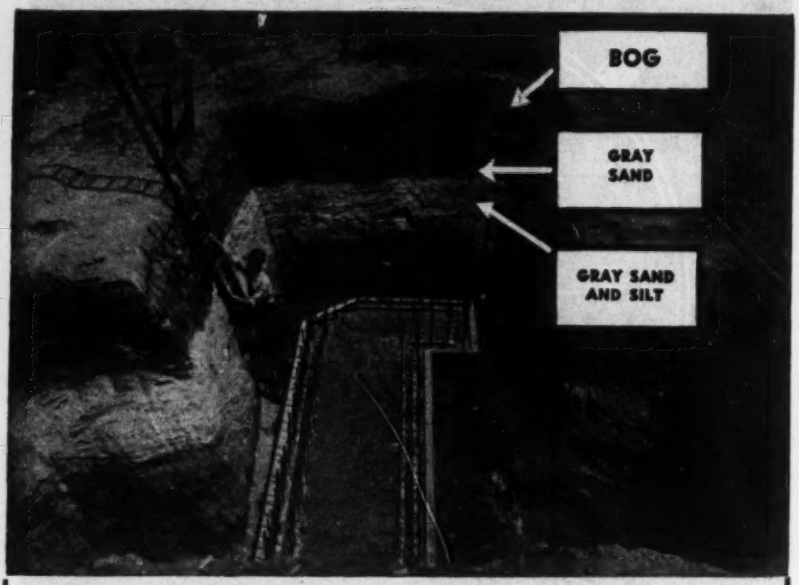

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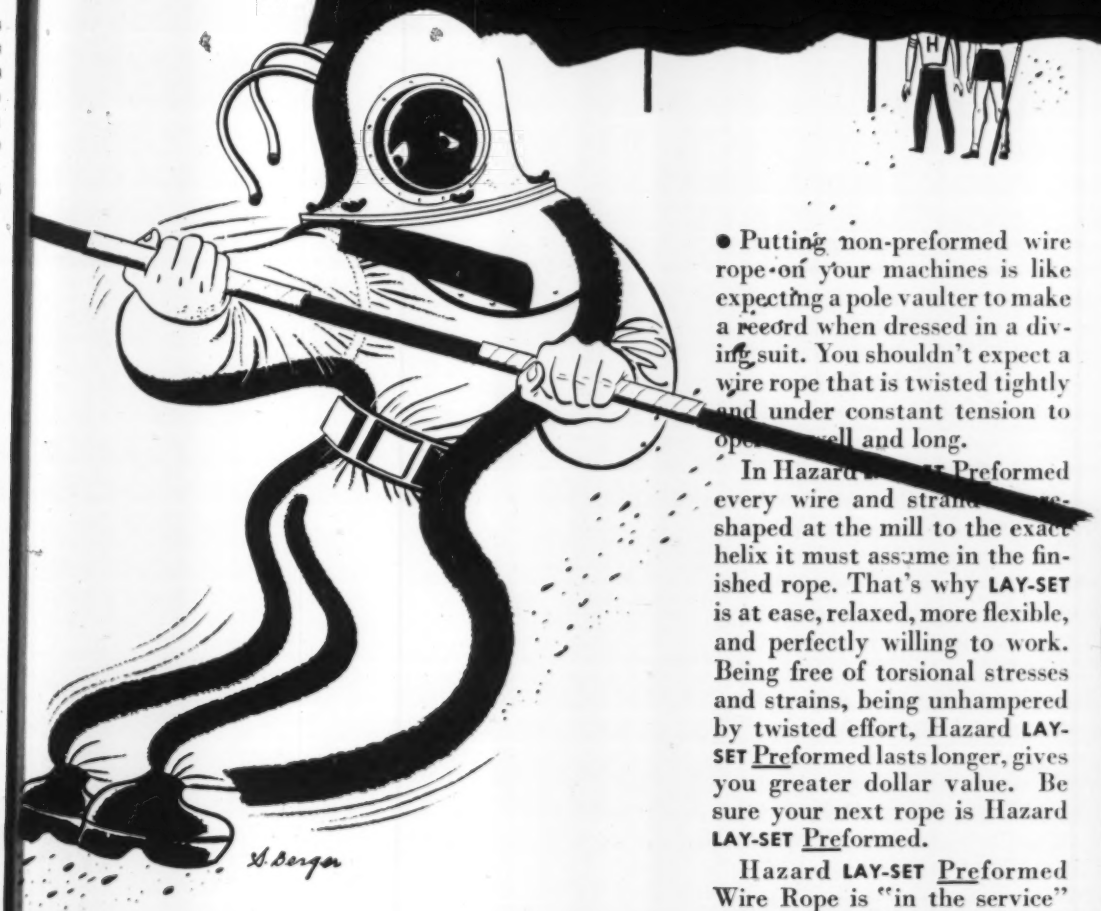

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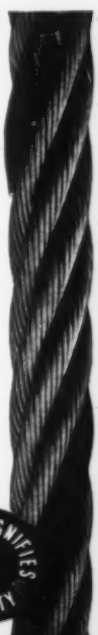

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Gentlemen:

With the successful completion of Shasta Dam and the cessation of The Columbia Construction Company's 9½ mile conveyor belt we feel your company to be deserving of a note of appreciation.

This belt, equipped with anti-friction troughing rolls that utilized some 70,000 Timken tapered roller bearings economically hauled the amazing total of almost 13 million tons of sand and gravel! -- and with an absolute minimum of repair and maintenance cost.

We can conservatively state that the entire conveyor system performed most satisfactorily in every respect. Congratulations!

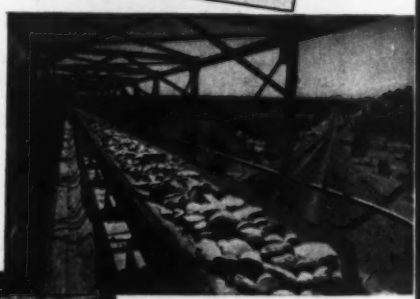
Yours truly,

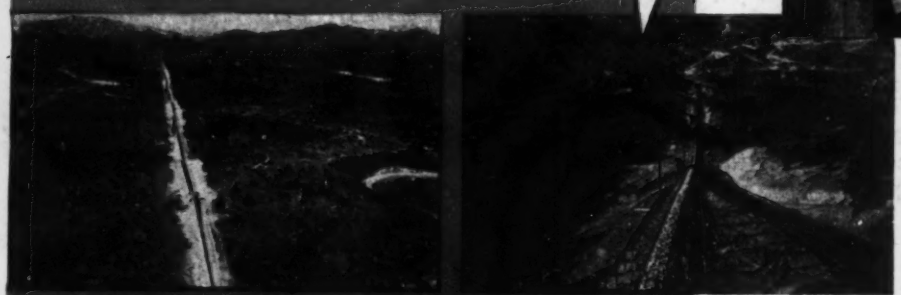
THE COLUMBIA CONSTRUCTION COMPANY, INC.

Henry J. Kaiser
President

HJK:vmcd

THE COLUMBIA CONSTRUCTION COMPANY REPORTS ON TIMKEN BEARINGS AT SHASTA DAM





Timken Bearing Equipped Conveyors manufactured by Chain Belt Company, Milwaukee, Wis.

TIMKEN
TAPERED ROLLER BEARINGS

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO